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Extended Abstracts

Cognitive assessment using 4AT

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Delirium is a serious neuropsychiatric disorder, affecting frequently old people with fragility fractures. It is considered as, of an acute onset, alteration of mental status with fluctuating course, reduced awareness and disturbance of attention. In particular, postoperative delirium consists a very compounding factor for hip fracture patients, as it is associated with increased morbidity and mortality. Delirium constitutes a considerable cause of patient and family distress during recovery period, increasing the need of care- givers and having a negative impact on the overall quality of life. The reported incidence of postoperative delirium regarding hip fracture patients ranges from 4% to 53.3%[1-3]. There is a list of both predisposing and precipitating risk factors that are related to delirium's development. Prompt recognition of these factors can contribute to the prevention or early identification of delirium. In spite of its high prevalence and significant consequences, delirium often goes under- recognised or misdiagnosed, and yet when diagnosis is made, is frequently mismanaged or goes untreated. It is, therefore, important delirium, not only to be identified but also to be properly managed[4].

The reference standard set of criteria for the diagnosis of delirium is codified in DSM-5, used in the clinical setting and research studies as well. Nevertheless, DSM-5 criteria require special training and extensive knowledge regarding delirium, while hip fracture patients experience very commonly a painful condition, are immobilised and fatigued, with minimal tolerance to repeated or prolonged testing. On the other hand, various assessment methods and screening tools have been used, in order to overcome DSM-5 criteria's barriers. CAM (Confusion Assessment Method), CAM-ICU and Nu-DESC (Nursing Delirium Screening Scale), are assessment tools suitable for the detection of delirium postoperatively. However, the reported low sensitivities in combination with the fact that a specially trained staff is required to perform assessment, limit their efficacy and everyday clinical use[4].

As a result, a simple, rapid and validated assessment tool for the recognition of delirium is required. The 4 'A's Test, or 4AT briefly, is a broadly used tool for the evaluation of delirium. 4AT is recommended from the European Society of Anesthesiology as an accurate and useful assessment tool for the recognition of postoperative delirium. The principal advantage of the 4AT is that it can be administered very quickly, within 2 minutes, in contrast to all other existing assessment methods. Moreover, 4AT is designed for daily use in the clinical setting by professional-level healthcare staff from a variety of disciplines, without requiring special training. Thus, 4AT is considered as an easy to learn, administer and score delirium assessment tool. The innovative characteristic of 4AT is that allows scoring of patients who are drowsy or agitated while other cognitive testing or clinical interview would exclude them. It incorporates short cognitive tests, the Months Backwards test and the Abbreviated Mental Test-4, resulting in the detection of moderate or severe cognitive impairment as well. 4AT evaluates all four basic components of delirium. Altered level of alertness remains a constant barrier for the most assessment tools, however 4AT takes this into consideration as it is a very valuable clinical sign, highly related to delirium. Additionally, acute onset and fluctuating course is the last feature that is assessed using 4AT, still even no informant exists, the test can be completed as the score is derived from the other components. 4AT is an independent of subjective judgements tool and does not demand physical responses like drawing figures or clocks. It can be administered everywhere, even in the emergency department, since no quiet environment is required[5].

The 4 'A's Test comprises one of the best-validated evaluation tools for the detection of delirium perioperatively, reporting a pooled sensitivity and specificity of 88%, both[6,7]. In the United Kingdom, 4AT is recommended, since 2017, to be administered routinely as part of the care bundle for hip fracture patients[3]. In Greece 4AT has been already translated and culturally adapted, while validation is currently in process.

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Complications after intramedullary fixation of intertrochanteric fractures

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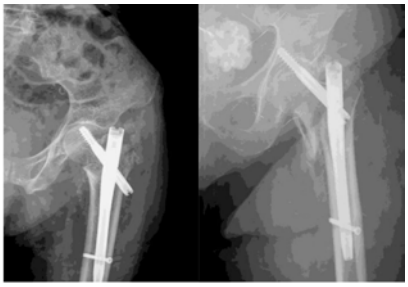
Introduction: The incidence of peritrochanteric fractures is increasing due to the aging of the population. This represents a major issue globally since it is one the most common injury in Orthopaedics. Most specifically, 250.000 cases occur in the United States and 70.000 to 75.000 in the UK, annually[1,2]. These types of fractures are usually seen as a result of a low energy fall from standing position, in the elderly[3].

Managing extracapsular (intertrochanteric) hip fractures by using intramedullary devices is becoming more popular since it has been associated with shorter operative time and hospital stay, less blood transfusions requirements, minimal soft tissue disruption and better biomechanical properties (less implant strain and shorter lever arm due to its closer position to the femur mechanical axis), when compared to the dynamic hip screw fixation devices[1].

The aim of our study was to look at complications related to the intramedullary hip fixation.

Patients and methods: We conducted a retrospective study including 186 patients (aged 68-103, mean age 82.3), that were managed in our department during the year 2019-2020 and had suffered an intertrochanteric fracture. All patients were managed by using an intramedullary hip nailing system. The mean hospital stay was 10.2 days (6-27 days). Three patients deceased on the 2nd, 4th and 8th postoperative day and were excluded from the study. Patients were discharged from the hospital and were advised to attend our Outpatient department 6 weeks and 12 weeks postoperatively.

Figures 1 & 2. Superior cut out of the intramedullary hip nail.



Results: 95 patients out of the 186 (51.07%), attended the Outpatient Department at 6 weeks for a follow up and 72 patients at 12 weeks (38.7%). All patients were clinically and radiologically assessed. Radiological union was assessed by using the RUSH score (Radiographic Union Score for Hip)[4] and the Tip to Apex Distance (TAD) was also assessed (values measured: 19-26 mm, mean 23 mm)[5]. 90 patients presented good outcomes of fracture healing, with maintenance of the original position of the Intramedullary Nail, within 6-14 weeks post-operatively. Three patients presented healing related complications and two patients suffered periprosthetic fractures. More specifically, superior Cut-Out of the lag screw was identified in two patients (1.07%) (female patients 90 and 87 years old respectively) 8 and 10 weeks following the initial surgery (Figures 1 & 2). Avascular Necrosis (AVN) of the Femoral head was found in one case (0.53%) (female, 81 years old) that occurred 12 weeks post-operatively. All three cases were revised by removing the nail and using cemented hemiarthroplasty. Periprosthetic fractures were observed in two patients (1.07%) (one female 73 years old and one male 88 years old). One patient underwent nail exchange from short to long intramedullary device and the other one underwent Open Reduction and Internal Fixation.

Discussion: Intramedullary nailing for peritrochanteric fractures has become widely popular in recent years. There are numerous advantages compared to the dynamic hip screw devices such as minimal blood loss and blood transfusion requirements, shorter operation time and hospital stay, and better biomechanical properties[6].

However, implant related complications may occur, and can be related to surgical techniques[7-9]. Malalignment of the hip fracture, iatrogenic intraoperative fractures, impingement, and penetration of the anterior femoral cortex are the most common primary complications which may occur. Moreover, Avascular Necrosis of the Femoral head, cut out of the lag screw and peri-prosthetic fractures, may also occur during the healing process[10].

Conclusion: There are many advantages in managing intertrochanteric hip fractures by using intramedullary hip devises such as shorter theatre time less blood loss and improved biomechanical properties. However, complications such as cut out of the lag screw and AVN and periprosthetic fracture are serious and challenging complications that require complex revision surgery.

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Balance evaluation and rehabilitation of older people in a dynamic platform

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The age-related consequences affecting all components of the complex balance control system (vision, proprioception,

vestibular function and musculoskeletal output) plus the burden of multimorbidity and polypharmacy frequently present in this vulnarable age category, have an impact on the postural responses in all types of perturbations. Assessing and treating balance disorders becomes paramount due to the close link between impaired postural responses and falls, so frequent in older people[1].

In the balance evaluation process we use, apart from the anamnestic data and the clinical examination, specific scales, with the intent to have more valid and reliable informations on what is wrong. There is a variety of clinical tests from simple to more complex ones, with good psychometric properties, that can give to the examiner valuable informations but they are all subjective[2]. In recent years different types of posturographic analysis are utilized in the clinical setting to have an objective measurement of balance, but some of the tesing protocols of this expensive machines do not have proven psychometric values.

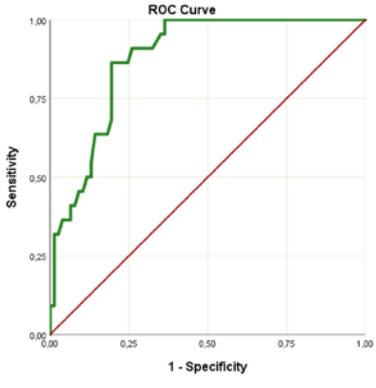
Balance rehabilitation is the ultimate goal when a disorder is being detected. There is a variety of interventions[3] in the literature on balance restoration with a dynamic platform in many conditions but little is known for their value in the rehabilitation of older people.

In this study we wanted to assess:

A. if the mCTSIB protocol of the Biodex Balance System (SD) has good psychometric values and can be used as an assessment tool for balance disorders in older women living in the community,
B. if the exercise protocols of the same platform are effective in balance rehabilitation for the same population.

For the first hypothesis, 100 women over 65 years community dwellers mean age 71.8 (SD±6, ranging from 65 to 91) years, were examined using the posturography modified Clinical test of Sensory Interaction on Balance (mCTSIB) protocol of the Biodex Balance system SD and the Greek Mini-Best Test (miniBESTest-GR)[4] to assess concurrent validity, with 24 undergoing a second measurement after one week to test the reliability of the method. The m-CTSIB-"Composite Score" test was significantly and positively correlated with the mini-BESTest-GR (r=-0.652, p<0.001) indicating good validity properties. The test-retest reliability was measured using the intra-class correlation coefficient (ICC) using a two-way mixed-effects absolute-agreement single-measurement model, among the two measurements of mCTSIB test (test-retest). No statistical difference was found between the two samples (N1=100, N2=24, t=-1.755, df=122, p=0.08). ICC estimates as 0.628 with 95% confident interval=0.31-0.82[5]. Also the mCTSIB has excellent sensitivity (86.4%) and specificity (80.5%) (Figure 1), for the diagnosis of balance disorders with a cutoff point 1.59. The area under the curve (AUC) is equal with 87.7% (95% CI=81.1% - 94.5%, p<.001). With the cutoff of 1.59 the 81.8% of patients can be correctly alloquated as having or not a balance disorder.

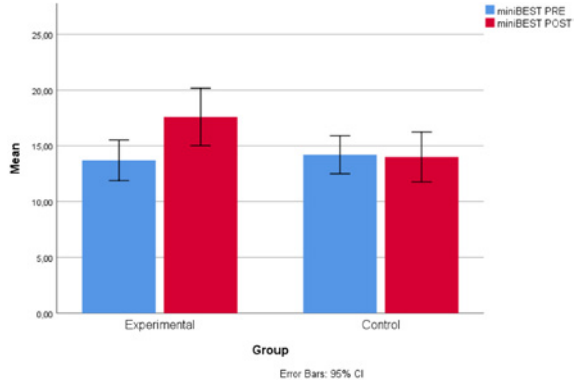
Figure 1. Sensitivity and Specificity of the mCTSIB test of the BBS.



For the second hypothesis, 23 women with balance disorders (miniBESTtest score under 18[6]) were randomnly assigned to an intervention or a control group. All participants completed an interdisciplinary Geriatric Comprehensive Assessment[7] in order to diagnose and treat any medical or other condition that could affect balance (polypharmacy, low vitamin D levels). The experimental group included n=10 participants who completed 3 months of balance exercise, divided by 3 sections per week for half an hour per section. During every section the patient was exposed to all different types of balance exercise protocols of the platform, the intensity and difficulty was gradually augmented depending on the response of the patient. The control group (n=12 in the begging, only n=10 completed the study) was not given any type of exercise for 3 months. After 3 months both the intervention and the control group were assesed to detect for any improvement.

A paired-samples t-test was conducted to compare miniBEST before and after the intervention for control and experimental group. There was not a significant difference in the scores of miniBEST-before, between the two groups (p=0.656). In control group there was not a significant difference in the scores for miniBEST-before (M=14.20, SD=2.39) and miniBEST-after (M=14.00, SD=3.13); p=0.509. In the experimental group there was a significant difference in the scores for miniBEST-before (M=13.70, SD=2.54) and miniBEST-after (M=17.60, SD=3.60); p<0.001 (Figure 2). We can conclude that the balance escercise protocols of the BBS are an effective tool for balance rehabilitation in community dwelling older women.

Figure 2. Comparison between the Experimental and the Control group miniBEST scores pre and post intervention.



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Fracture Liaison Service (F.L.S.)

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A fragility fracture is defined by the W.H.O. as "a fracture caused by an injury that would be insufficient to fracture a normal bone". The forces that cause these injuries were quantified as being equivalent to those experienced from a fall from standing height or less. It is calculated that 50% of women and 20% of men will suffer a fracture in their remaining lifetime and 50% of those are at an increased risk of fracture due to low bone density. A study in Greece has revealed that there were approximately 86,000 new fragility fractures in 2010, with an economic burden of 680 million € per year, a number that will increase by 20% by 2025.

Fragility fractures have very poor prognosis. Even if they are treated adequately, either conservatively or surgically, they lead to severe consequences, such as exceed mortality (10-25%), inability of walking independently after a hip fracture (50%), substantial decline from prior level of function (50%) and, of course, increased risk for a subsequent fracture.

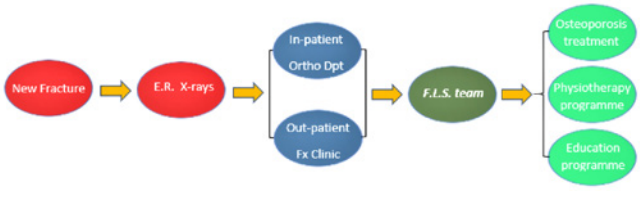
Positive identification of fragility fractures is critical to the care of patients with osteoporosis. To reduce the risk of re-fracture a co-ordinated approach is needed to identify patients most at risk. A Fracture Liaison Service (F.L.S.) is a multi - disciplinary approach that systematically identifies, treats and refers to appropriate services all eligible patients over 50 years old within a local population who have suffered fragility fractures. The F.L.S. is designed to close the care gap for fracture patients, 80% of whom are currently never offered screening and/or treatment for osteoporosis and to enhance the communication between health care providers by providing a care pathway for the treatment of fragility fracture patients.

According to a review by Ganda et al. in 2013, F.L.S. models were grouped in 4 main types:

- Type A identifies, investigates and initiates treatment.
- Type B identifies and investigates patients, but then refers to the primary care physician for treatment initiation.
- Type C identifies patients at risk and inform them and their primary care physician, but does not undertake any assessment or treatment of the patients.
- Type D identifies at-risk patients, informs and educates them, but takes no further part in communicating their findings to other stakeholders in the patient's care.

The main structure of a Fracture Liaison Service is illustrated in Figure 1.

Figure 1. F.L.S structure as proposed by the International Osteoporosis Foundation.



According to this, all patients over 50 years old with a fracture resulted from minimal trauma are addressed to F.L.S. The fragility fracture patients who agree to participate to the program are asked to sign the informed consent form. A patient's electronic file is created and includes the appropriate data (hip and lumbar spine BMD, FRAX calculation, thoracic and lumbar spine X-rays, relevant laboratory tests). The final assessment includes a recommended antiosteoporotic treatment and a specific exercise and educational program.

The majority of studies on F.L.S. refer very promising results. Eccles et al., in their narrative review regarding the effectiveness of F.L.S. in the U.K., have shown that there has been significant reduction of the risk of secondary fractures in patients who participated in F.L.S. programs, while these were cost effective. Stephens et al., in their study in the U.S.A., suggest that a wider adoption of an F.L.S. model has the potential to improve care for patients with hip fracture by narrowing the osteoporosis treatment gap. Furthermore, a prospective cohort study by Van Geel et al. has revealed reduced risk for subsequent fragility fracture and lower risk for mortality in patients with fragility fractures treated with oral bisphosphonates in an F.L.S. setting. Another review by Walters et al. refers that the F.L.S. model is associated with reduction in re-fracture risk, reduced mortality, increased assessment of bone mineral density, increased treatment initiation and adherence to treatment and is cost-effective.

In conclusion, and based on the majority of studies, F.L.S. is a proven model of fragility fractures secondary prevention that improves patient's quality of care, provides targeted intervention, enables appropriate medicine prescribing, reduces hospital admissions, reduces hospital and social costs, and finally improves quality of life, health and well-being of fragility fracture patients.

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Frailty-metrics

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Introduction: Frailty is a syndrome most associated with longevity characterized by multisystem disturbance in physical homeostasis. The resulting vulnerability leads to poor quality of life, hospitalization, falls, fractures, premature morbidity and mortality in older people[1]. Pathophysiological mechanisms are not yet fully understood and research is mainly observational upon clinical manifestations and risk-prediction. In a longitudinal study of Trevisan et al, subjects experienced both deterioration but also improvement of frailty state[2]. Special considerations should be made on many factors that contribute for frailty onset and progression which are demographic, psychosocial, clinical, life-style and biological[3]. Taking into account the dynamic and multi-factorial nature of frailty could probably justify quantification difficulties.

A point in history of frailty-metrics

Milestone year was 2001 when is published by Fried and colleagues the Frailty Phenotype followed by Mitinski and colleagues Frailty Index, leading to operational definition[4,5]. Frailty Phenotype is more related to "physical frailty" a term that is being used in research to define frailty as a syndrome affecting functional ability of a person. It compromises evaluation of muscle strength, gait speed, physical activity, self-perceived exhaustion and weight loss. Alternatively, Frailty Index is theoretically closer to the traditional medical frame of diagnosis-centered approach, rating accumulation of morbidities. Both concepts have been widely used retaining their pros and cons. Emerged research publicity from 2001 until today derived plural modification in measurement frames but when comparison is made appears a significant effect on classification and predictive ability[6].

Frailty-metrics in health-care domains

Along with variability in psychometric properties of measurement tools feasibility is another vast component of perplexity. In primary care for large epidemiological studies evaluation tools should be selective, prolonged, combined with special equipment (dynamometers, time-calculators etc.) and special educated personnel.

In acute care stabilization of the patient is most significant therefore measurement should be easy, not time-consuming integrated in the context of medical history. It is notable that Clinical Frailty Scale has been validated in the ED setting[7].

Specialized care holds an individualized sector of healthcare; thus, evaluation of frailty should be modified following every medical specialty needs. Geriatric medicine, cardiology and cardiac surgery are among specialties with robust evidence in greater prevalence of frailty whilst Orthopedic surgery and Traumatology support emerging evidence. The FRAIL scale in a study of Gleason et al was proposed to predict adverse postoperative outcome and perioperative management in geriatric patients with fracture[8].

Frailty is not well addressed in post-acute and palliative care settings[9,10]. The decline of patient's state must be taken into consideration to guide evaluation and management without risk enhancement. Assessment should define severity summarizing all previous results combined with patients and family care-givers volition for quality of life in end -life.

Conclusion: Concluding, there is not a single approach or tool to measure frailty covering all clinical or research demands. Surely frailty evaluation should be incorporated as standard clinical praxis for older people taking into account physical capabilities, psychosocial, cognitive, nutritional status and comorbidity in order to provide a holistic health-care management.

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Functional recovery and mortality rates after hip fractures. The effect of zoledronic acid and high doses of vitamin D

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Introduction: Even with optimal treatment, hip fractures are associated with inferior functional recovery and increased mortality rates[1-4]. While it is known that vitamin D has a positive effect on pain, muscle strength and balance, elderly patients, especially those with hip fractures, have a higher incidence of vitamin deficiency[5]. The hospitalization of hip fracture patients is thus an opportunity to both correct any vitamin D deficiency and start medical treatment for osteoporosis.

The purpose of the study was to evaluate whether hip fracture patients could benefit from a combination treatment of zoledronic acid and high doses of vitamin D.

Material and Methods: Between March 2018 and December 2018, 98 consecutive patients with hip fractures (both trochanteric and femoral neck) were recruited into our study, applying various inclusion and exclusion criteria. After surgical treatment, patients

were separated into two groups. In group A (48 patients), 25.000 IU vitamin D per week and 1000 mg of calcium per day were administered for two months followed by daily doses of vitamin D and calcium. In group B (50 patients), medication was not administered but a recommendation was made for patients to attend a primary care facility for osteoporosis evaluation. Pre- and post- operative assessments included vitamin D measurement, Barthel functional index for activities of daily living, AMTS dementia score, VAS pain, Charlson Comorbidity Index and ASA score. Time to surgery and major complications were also recorded. Time intervals for follow-up evaluation were set at 6, 12 weeks and one year. At final follow up all patients were clinically examined and radiographs were performed to evaluate fracture healing and possible mechanical failures. Primary outcome end point was functional recovery at one year. Secondary outcome end point was VAS pain and mortality.

Table 1. Patients' demographics.

	Group A (zoledronic acid plus high dose vitamin D)	Group B (control)	P value
Age (years) (mean±SD)	83.6±7.9	79.3±7.5	**0.018 (t-test)***
Gender			
Females (n/%)	36/80.0%	32/70.0%	0.368 (chi square)
Males (n/%)	9/20.0%	14/30.0%	
Type of fracture			
Neck of femur (n/%)	20/44.4%	27/58.7%	0.455 (chi square)
Pretrochanteric (n/%)	25/55.6%	19/41.3%	
Charlson comorbidity index (mean±SD)	4.7±1.1	4.4±1.6	0.392 (t-test)
ASA score (mean±SD)	2.3±0.8	2.5±0.6	0.149 (t-test)
Days from admission to surgery	2.6±1.8	3.0±2.1	0.391 (t-test)
Pre-operative Barthel index score	18.0±2.8	18.8±3.5	0.286 (t-test)
Dementia (n/%)			
No	36/80.0%	41/89.1%	0.282 (chi square)
Yes	9/20.0%	5/10.9%	
Vitamin D at admission (ngr/ml)	7.4±5.2	8.2±6.1	0.459 (t-test)

** statistically significant, p<0.05.*

Results: Three patients in group A and four patients in group B were lost to follow-up. Thus, the final number of patients who were finally assessed was 45 in group A, 46 in group B. Patients demographics are shown in Table 1. Patients of both groups were matched regarding all parameters except age.

Table 2. Results between groups concerning Barthel index, VAS pain score mortality and complications.

	Group A (zoledronic acid plus high dose vitamin D)	Group B (control)	P value
Post-operative Barthel index score	15.4±5.0	15.8±5.8	0.850 (t-test)
Change in Barthel index score	**-2.3±2.9 (paired t test, p=0.01)***	**-3.0±4.2 (paired t test, p=0.0001)***	
VAS pain score	1.3±1.6	1.3±1.3	0.858 (t-test)
Mortality (n/%)	4 of 45/8.8 %	13 of 46/28.2%	**0.047 (chi square)***
Complications (n/%)	8 of 45/17.7%	7 of 46 / 15.2%	0.751 (chi square)

** statistically significant, p<0.05.*

Following surgery patients of both groups showed a decline in function. Comparing Barthel index between groups, at one year, no statistically significant (s.s.) difference (student's t test, p=0.850) was found (Table 2). Barthel index decreased more than 3 points in the control group only, which was both clinically and statistically significant (Table 2). Mortality rate was s.s. higher (chi square, p=0.047) in the control group. No s.s. differences were observed in VAS scores (t test, p=0.858) between the two groups.

Regression analysis was used in order to identify factors affecting Barthel index. Age (Pearson correlation, p=0.038), Charlson index (Pearson correlation, p=0.00006), pre-operative Barthel index (Pearson correlation, p<0.00001), dementia (t-test, p=0.038) and type of fracture (t-test, p=0.076) showed s.s. correlations in univariate analysis. Only pre-operative Barthel index (p<0.00001) and Charlson index (p=0.027) showed s.s. correlations in multivariate analysis. Regression analysis was also used in order to identify factors affecting mortality rate. ASA score (t-test, p=0.027), Charlson index score (t test, p=0.021), gender (chi square, p=0.05), complications (chi square, p=0.001) and treatment group (chi square, p=0.047) showed s.s. correlations in univariate analysis. Treatment group (p=0.022) and complications (p=0.002) showed s.s. correlations only in multivariate analysis.

Discussion and Conclusions: This study demonstrates that early correction of vitamin D deficiency and administration of zolandronic acid reduces mortality and possibly slows down functional decline after hip fracture.

Intravenous zolandronic acid has been shown to reduce mortality probably through anti-inflammatory and immunomodulating effects[6,7]. The above observation was confirmed in our study. Other studies have shown no effect when general osteoporosis treatment was assessed[3,4]. Several factors have been identified as influencing mortality rates after hip fractures[3,4,6,7]. In our logistic regression model we confirmed the effect of the factors treatment and complications only. Osteoporosis treatment has been shown to have an effect on functional recovery after hip fractures[3,4]. In our study we confirmed that iv zolandronic acid and high doses of vitamin D reduce functional decline after hip fractures. Several factors have been identified as influencing functional outcome after hip fractures[3,4,8,9]. In our logistic regression model we confirmed the effect of the factors preoperative Barthel index and Charlson index only.

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Hip fragility fractures in the elderly: the reality in Greece during the recent financial crisis

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Purpose: The present study aims at the evaluation of modifiable and non-modifiable factors affecting quality of life and mortality in elderly patients suffering from a low energy hip fracture.

Methods: This was a prospective controlled clinical study conducted between August 2013 and August 2016 simultaneously at a tertiary care University Hospital and a regional General Hospital, located at the central and the north-western part of the country respectively. Inclusion criteria were: a) age 65 years or above, b) admission for proximal femur low-energy fracture (intracapsular, intertrochanteric or subtrochanteric location), c) signed informed consent agreeing to participate in the study and d) follow-up for at least 12 months or until death prior to 12 months. Exclusion criteria were: a) patients with hip fractures with concomitant injuries, b) patients that denied to be included in the study or failed to attend scheduled follow-ups and c) patients suffering from multiple or pathologic fractures.

All included patients were evaluated with the Functional Independence Measure and the Functional Assessment Measure (FIM+FAM), the 12-item Short Form survey (SF-12) and the American Society of Anesthesiologists (ASA) physical status classification system. Other parameters that were also recorded were time to surgery (and reasons for delay), readmissions, mortality rate and time to death.

Results: A total of 744 patients were found eligible for inclusion in the study. Their mean age was 83 years. Eighteen patients (2.4%) died during their hospital stay, 68 patients (9.1%) died within the first month from diagnosis and 144 patients overall (19.4%) died within the first year since diagnosis.

• Differences between age

Patients over the age of 81 comprised 64.52% of the study population. These patients had a higher mortality rate (23.96% vs. 10.98%, p<0.05) compared to patients under 81 years of age and significantly shorter time to death (297.6 vs. 334.1 days, p<0.001).

• Differences between hospitals

In the regional, secondary care, General Hospital, 147 patients were included in the study, with mortality rate reaching 23.81%. Mean time to death was 293.8 days. In the University Hospital, 597 patients were eligible for inclusion, and their mortality rate was 18.26%. Mean time to death was 314.7 days and it did not differ significantly between hospitals (p=0.096).

• Differences between sexes

There were 501 female and 243 male patients. During the three-year study period and regardless of treatment, mortality rate was 23.05% for male patients, and mean time to death was 298.3 days since fracture diagnosis. Female patients had a mortality rate of 17.56% and mean time to death was longer compared to the male cohort (316.5 days), although it did not reach statistical significance (p=0.062).

Table 1. Factors affecting mortality rate and time to death.

Factors	Sample size	Deaths	Mortality rate	Mean Days to death (+SD)
ASA score				
I	34	0	0	
II	268	8	3%	
III	394	100	25.4%	
IV	a48	36	75%	
Time to surgery				
0-12 h	69	5	7.3%	349.45 (7.5)
12-24 h	154	14	9.1%	339.4 (6.8)
24-48 h	143	17	91.9%	333.7 (7.5)
>=48 h	315	67	313.422	313.4 (6.4)
Readmission (days from discharge)				
0-30	45	25	55.6%	185.2 (24.8)
31-365	104	29	27.9%	296.9 (11.55)
Total readmissions	149	54	36.2%	263.2 (11.8)
No readmission	577	72	12.5%	
Age				
<81	264	29	10.98%	334.1 (5.9)
>=81	480	115	23.96%	297.6 (5.9)
Sex				
Male	243	56	23.05%	298.3 (8.3)
Female	501	88	17.56%	316.499 (5)
Treatment				
Surgical	681	103	15.12%	323.7 (4)
Conservative	63	41	65.08%	173.7 (19.9)
Type of fracture				
Intracapsular	242	50	20.66%	305.9 (7.8)
Intertrochanteric	447	88	19.69%	309.7 (5.7)
Subtrochanteric	55	6	10.91%	337.65 (11.9)
Hospital				
University	597	109	18.26%	314.7 (4.7)
Regional	147	35	23.81%	293.8 (11)
Total	744	144		310.6 (4.4)

• Type of fracture

Fracture type distribution is depicted in Table 1. No fracture type predisposed to higher mortality rate (p=0.245) and shorter time to death (p=0.267).

• Conservative vs. surgical treatment

Out of 744 eligible patients, 8.47% were treated conservatively. Mortality rate for these patients was 65.08% and mean time to death was 173.7 days, since fracture diagnosis. Patients treated surgically had a mortality rate of 15.12% and mean time to death was significantly longer (323.7 days, p<0.001).

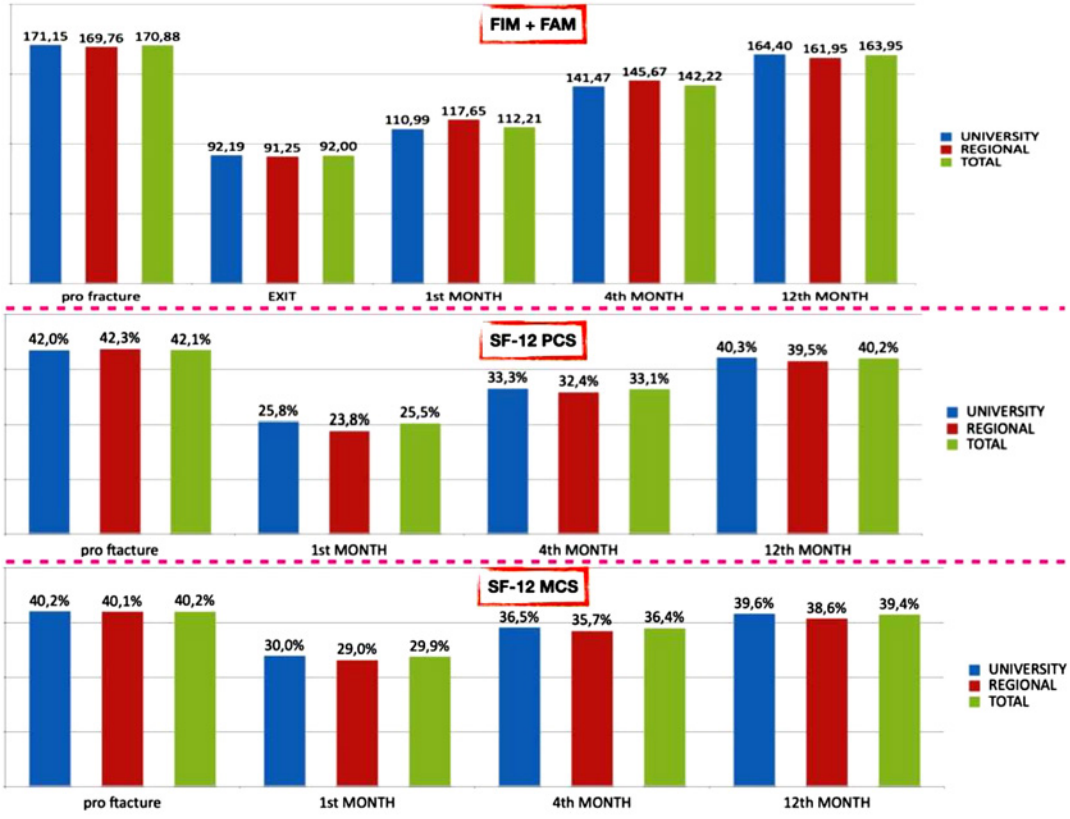
• Time to surgery

Patients were grouped as presented in Table 1 according to time lapse between hospital admission and surgery. There was lower overall survival (78.7%) and shorter time to death (313.4 days) for patients operated 48 hours or more from admission compared to patients operated sooner (p=0.002). Reasons for delay for more than 48 hours were lack of theatre time (62%), a medically unfit patient (34%) or lack of surgical implants (3%).

• ASA

Patients were assigned an ASA physical status as presented in Table 1. As expected, patients assigned an ASA status IV had significantly higher mortality rate (75%, p<0.001).

Figure 1. Depiction of FIM+FAM and SF-12 scores per hospital.



• Readmission

Table 1 shows readmission and mortality rates. Patients that were readmitted shortly after initial discharge (0-30 days) had significantly higher mortality rate (55.6% vs. 27.9%, p=0.01) and shorter time to death (185.2 vs. 296.9 days, p<0.001). Patients that required readmission at any point also had higher mortality rate compared to the group of patients that did not require readmission.

• Quality of life

FIM+FAM and SF-12 are depicted in Figure 1. Overall, functional capacity and quality of life did not differ significantly prior to fracture and 12 months postoperatively. Differences were significant at one month and at 4 months postoperatively.

Conclusions: Female sex holds a higher risk for suffering a proximal femur fracture over the age of 65. Lack of theatre time for safe surgical practice is a major yet modifiable reason for surgical delay that leads to increased mortality. Comorbidity, age over 81, readmissions and conservative treatment also increase mortality.

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Towards an integrated primary care model in the context of the COVID-19 pandemic: Experience gained from Greece

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Greece is a country in which integrated care is still lacking, although significant efforts have been made more recently. In 2015, Tsiachristas et al. reported on a detailed analysis of the Greek healthcare system and its challenges for enhancing integrated care[1]. Four years later, several of the interlinked integrated care

prerequisites remain particularly relevant. The integration of public health goals into PHC could be a first step to initiate discussion about integrated care in European settings. This could furthermore facilitate implementation of a second level of integration that links primary care with mental, hospital, and social care. A recently published paper, attempted to offer a framework on how best to design and rapidly test evidence-based approaches that can serve to address public health priorities, improve health and well-being of the population, and support evidence-informed policy making in Greece[2]. In another published work, training and empowering patients, families, caregivers, health professionals, and policy makers to define and promote integrated care was identified as an imperative action[3].

Some few months prior the pandemic another report from Greece issued recommendations that were designed to guide current health policy towards an effective integrated PHC model. This report included among others the following recommendations[4]:

1. Effective human resource planning
2. Implementation of a fully operational e-communication, interoperable, system
3. Orientation of the new PHC units to address major public health
4. Coordinated actions for integrated chronic disease care
5. Emphasis on integrating public health and PHC, and information flow and exchange
6. Development of core competencies and implementation of a coordinated continuing education program for PHC professionals
7. Interprofessional collaboration
8. Coordination of care by the regional and local health authorities

Towards an integrated model for frailty

In parallel with the efforts made in Greece, in Europe, a Joint Action project underlined that an effective model of care for frailty should include a single entry point in the community (generally in Primary Care); the use of simple frailty specific screening tools in all care settings; comprehensive assessment and individualized care plans, including for caregivers; several tailored interventions by an interdisciplinary team-both in hospitals and community; case management and coordination of support across the continuum of providers; effective management of transitions between care teams and settings; some shared electronic information tools and technology enabled care solutions; and, several clear policies and procedures for service eligibility and care process[5]. Questions also raised on the composition of the frailty team in primary care and a current policy paper from the NHS in the United Kingdom recommended a multi-disciplinary team that would deliver geriatric assessments that should include as ra minimum: a competent specialist physician in medical care of older people, a coordinating specialist nurse with experience, a senior social worker or a specialist nurse who is also a care manager and some dedicated appropriate therapists[6]. There are also questions on the timeframe that is needed to achieve improvements in the valued outcomes of community-based interventions from frailty. A recent Spanish study reports that a "real-world" multidisciplinary intervention, integrating primary care, geriatric care, and community services may improve physical function, a marker of frailty within 3 months[7].

Finally, a recently published report from a European Commission collaborative and multi-staged innovation named project VIGOUR, indicated that this approach of integration seems robust enough to work within the challenges evoked by the pandemic and flexible enough to take advantage of integrated care initiatives which have been tested on a pilot level and adopt them to specific needs emerging as a result of the pandemic. The VIGOUR project emphasizes the need for a collaboration between health and social care services.

Conclusions: Despite the significant interest in integrated care, even prior the pandemic, integrated healthcare service delivery, encompassing PHC, public health, social care and evidence-based practice largely remains a neglected area in many European settings. The interface between hospital, mental health, public and social health and primary care remains an unfolding discussion and there is an urgent need for designing and implementing community-based interventions and experimental work that address this with a particular focus on frailty and people with multi-morbidity. Training and empowering patients, caregivers, health professionals and policy makers to define and promote integrate care is also a high priority.

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Investigating depression during the quarantine due to the pandemic in a sample of elderly people in Patras

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COVID-19 and Depression

The COVID-19 pandemic invaded suddenly in our lives and came to change our daily way of living in such a short time. One of the measures adopted for social health protection was that of quarantine. However, pandemic and quarantine brought about various negative emotions, such as fear, anxiety, insecurity, changes in daily life and environment of the elderly, while many of them were led to social and physical isolation. All these have had a negative impact on the psychological state of these individuals and as a result many of them developed depressive symptoms or depression.

Depression and relationship with Falls, Fragility Fractures and Osteoporosis

Depression can be a risk factor for falls and fragility fractures. This is confirmed in various studies and meta-analyses[1,2]. There is a bidirectional relationship between these three concepts, depression, falls and fractures, that create a vicious circle that is self-perpetuating. Antidepressants in combination with depression-related factors such as fear of falls, gait and eating disorders etc., predispose to falls and these in turn, as fear increases, cause depression, triggering avoidance behaviours and social isolation but also injuries or disability from possible fractures[3]. Finally, depression directly affects bone metabolism through various mechanisms with a negative impact on bone density causing the onset of osteoporosis[4].

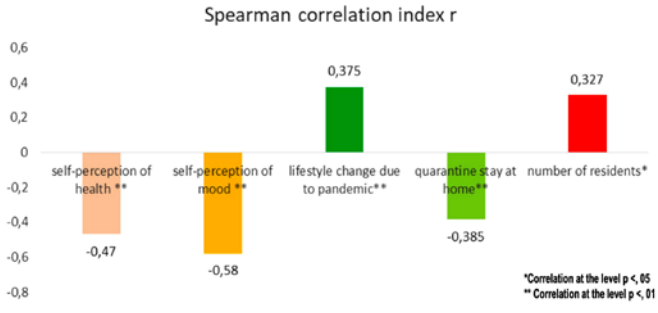
Investigating depression during the quarantine due to the pandemic in a sample of elderly people in Patras

The survey was conducted by telephone on a sample of 55 elderly people in April 2020 in order to investigate the effect of quarantine, as a public protective health measure of the population from the SARS-Cov2 coronavirus, in relation to the existence of depression. The tools that were used during the telephone interview were: a) The GERIATRIC DEPRESSION SCALE (GDS-15 items), a decimal scale in which 1 is the lowest possible value and 10 the highest, and is used to determine health self-perception, mood self-perception and lifestyle changes due to the pandemic and b) A Likert scale to assess the compliance with state measures "stay at home" (1=absolute compliance and 5=no compliance).

The mean GDS value in our sample was found to be 4.61 (S=±3.24) [3.72 (SD=±2.90) for men and 4.84 (SD=±3.31) for women]. This was significantly better in comparison with the corresponding study[5], which was conducted in a sample of 78 elderly people, who attended the program at an Open Care Centre for the Elderly in Crete in a rural area, before the beginning of the pandemic. The corresponding value of this study was found to be 5.9 (SD=±4.1). However, the mean value of the GDS in our study was higher than the reference value of the Greek population of healthy elderly, with an average age of 79.98 years, which was 2.96 (SD=±1,66)[6].

Diagram 1 shows that older people with greater number of depressive symptoms are more likely to have low self-perception about their physical health, emotional well-being and vice versa. These findings are related to the pandemic. These show that seniors who believed that the onset of the pandemic has led to changes in their lifestyle are more likely to have higher GDS-15 values and vice versa. In contrast, a significant negative correlation (p<,01) was found between GDS-15 values and the stay of the elderly at home.

Diagram 1. Corelations of GDS-15 with the Self perception of health and other parameters.



An interesting result is the positive statistical correlation (p<0.05) between GDS-15 values and the number of people who live with the elderly of our sample. This finding seems contradictory, as the elderly who are living alone face the problem of loneliness. However, there are elderly people who live with their children because of their children's health or financial problems. Therefore, cohabitation with other people beyond the couple is not a choice, but a necessity.

Conclusions: The study showed that about 1/3 of the sample (34.6%) were depressed and although the mean GDS-15 (4.61) is marginally below the moderate depression, it is above the average value (2.96), which was found in the healthy Greek population. Older people staying home during quarantine are more vulnerable in developing depression. This should be under concern to the health policy makers, as depression is a risk factor for other diseases, especially falls and fractures.

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Management of sarcopenic patient

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Aging is associated with skin sagging, kyphosis and a reduction of muscle mass and strength; the concurrent progressive loss of functional performance that takes place appears completely normal. The term sarcopenia which is derived from the words "sarx" meaning flesh and "penia" meaning loss, originally described the loss of lean body mass during "healthy" aging. In 1988, Irwin Rosenberg defined sarcopenia as the loss of muscle mass related to aging, indicating the critical role muscles play in disability and incapacity. As a result, sarcopenia is defined as the age-related decrease of muscle mass and strength. In adults, low muscle strength is associated with reduced functionality and signifies frailty. Increasing muscle strength corresponds to an increase in functional performance, thereby reducing an individual's vulnerability. An individual's functional performance becomes normal once a high level of functionality is achieved, above which any increase is independent of the normal level of function.

Individuals greatly rely on their skeletal muscles to interact with their environments and to carry out routine tasks in their everyday life. Sarcopenia has a significant impact on the daily activities, functional

status, disability and quality of life in older populations. According to the revised European consensus on definition and diagnosis of Sarcopenia, the definition and classification of this syndrome has been modified, and it is now necessary to first evaluate an individual's muscle strength. If muscle strength is found to be reduced, the individual is considered a 'probable sarcopenia' case; when this is combined with low muscle mass (quantity or quality), the condition is characterized as 'sarcopenia'. If an individual is found to have reduced functional performance in addition to the above, then the condition is defined as 'severe sarcopenia'.

While age-related sarcopenia is characterized as primary sarcopenia, secondary sarcopenia is attributed to alternate causes, including those related to specific activities, disease or nutrition. Therefore, situations which in one way or another lead to the above-mentioned causes - including bed rest, sedentary lifestyle, inflammatory diseases, endocrine diseases, neurodegenerative diseases, malignancy, inadequate diet, gastrointestinal disorders, cachexia etc. - may themselves cause secondary sarcopenia individually.

When the duration of sarcopenia is up to 6 months, it is referred to as acute sarcopenia; however, when the duration of the condition exceeds 6 months, it is characterized as chronic sarcopenia. A simple questionnaire (SARC-F) is utilized to begin investigating the condition. The questionnaire refers to: strength, rising from a chair, climbing stairs, the need for assistance in walking, and the number of falls during the past year. A clinical suspicion for sarcopenia exists after completion of the SARC-F questionnaire, and a cutoff value: ≥4. First, muscle strength is assessed (Grip strength or Chair stand test). With low muscle strength "probable sarcopenia" is confirmed. Muscle quantity or quality (DXA, BIA, CT, MRI) follows for the confirmation of "Sarcopenia" (when muscle mass is low). In the end a physical performance assessment (gait speed, SPPB, TUG, or 400 m walk) is conducted in order to determine a classification of "severe Sarcopenia".

Therapeutic approaches for the management of sarcopenia consist of nutritional supplementation and progressive resistance exercise training. In the context of physical activity, aerobic exercise could be included to support aerobic capacity and quality of life. Due to the pathogenesis of sarcopenia, additional therapeutic approaches are being considered, including regenerative therapies, testosterone, growth hormone, insulin-like growth factor, ghrelin or vitamin-D supplementation. Many of the above-mentioned approaches lack evidence or insufficient evidence exists for their use in sarcopenia. For the effective treatment of disease-attributed secondary sarcopenia, it is necessary to treat the related disease in order to treat the sarcopenia.

In conclusion, sarcopenia has a great impact on older individuals, particularly related to their daily activities, functional status, disability and quality of life. Annual screening of all adults over the age of 65 years should be conducted. Furthermore, an exercise regimen should be recommended (primarily resistance exercises), as well as increased protein intake reaching nearly 2.0 g/kg/d or greater in severe catabolic states. The use of a leucine enriched high protein supplementation, such as whey protein, should also be considered. Individuals should take 25-30 grams of protein with each meal, while persons with low bioavailable vitamin D should receive adequate vitamin D supplementation. To prevent or delay sarcopenia, the development of muscle in youth and young adults should be maximized, among middle aged populations muscle should be maintained, and the loss should be minimized in older populations. The use of exercise therapy should begin at an early stage, even while patients are in the hospital. Sarcopenic patients must remain in an exercise group for the rest of their life.

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The necessity of multidisciplinary approach in fragility fractures

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Introduction: Osteoporosis and fragility fractures have been recognized as a crucial public health issue. As aging population raises concomitant fragility fractures will increase with geometric progress producing large economic burden. Also special concerns should be made about impact at personal health level. Osteoporosis and its subsequent fractures are related with poor quality of life, comorbidity, polypharmacy and mortality. The FFN's vision is a contemporary society where patients suffering from fragility fracture will have interdisciplinary management, optimal rehabilitation, maintaining their independence and quality of life. In this modern approach primary prevention, targeted intervention and secondary prevention will enhance patient's safety diminishing hospitalization and re-fracture possibility leading to reduction in health-care costs. In order to fulfill this goal it is mandatory to expand cooperation among different health-care professionals.

FFN and multidisciplinary approach

The first pillar of FFN is the multidisciplinary care of patients with acute fracture episode such as hip, clinical vertebral and other major fragility fractures. To achieve the pillar's objective a non-negligible number of health professionals must be stratified. Patients with osteoporotic fractures are mainly elderly, frail people with co-morbidities many of them suffering sarcopenia, dementia and malnutrition[1,2]. Therapeutic team should be consisted of key members such as orthopaedic surgeons, geriatricians or general practitioners, anesthesiologists, nurses, physiotherapists, dieticians, social workers, and other healthcare professionals depending on individual's special needs. The success of team's work is directly associated with adequate collaboration and communication among members.Regarding to the second pillar of FFN postoperative rehabilitation must begin as early as possible. Optimally, an individualized planned rehabilitation program should be conducted by a multidisciplinary team, including social support and nutritional advice for a long interval after discharge. Published literature indicates that only 40 to 60% of patients following hip fracture are presumptively to gain their pre-fracture level of mobility[3]. Following a hip fracture surgery, recovery is magnified if a realistic rehabilitation program is provided. Rehabilitation

pathway includes diagnosing and treating impairments, in addition to secondary prevention interventions related to osteoporosis, decelerating loss of function and when this is impossible, compensating missed functions[4,5]. Whereas, healthcare workers should eliminate barriers in order to supply rehabilitation services in lower and middle income countries as well. According to the third pillar of FFN secondary prevention following fragility fracture is obligatory in order to secure that individuals with osteoporosis are appropriately treated. This prerequisite needs a timely and effective identification of patients vulnerable to present with fragility fractures. The International Osteoporosis Foundation promoted the "Capture the Fracture" campaign aiming to improve the implementation of well-coordinated, multidisciplinary models of care in terms of secondary fracture prevention globally. The first pilot implementation of a fracture liaison service in Greek healthcare setting was conducted by Makras and colleagues in a single-center, prospective study[6]. In a systematic review and meta-analysis, of a total of 159 articles, assessment and management through fracture liaison services programs seemed to benefit patients outcomes through increasing bone mineral testing, early treatment initiation and adherence to treatment. Subsequently a decline in rates of clinical re-fractures and mortality was stated[7]. The fourth Pillar of FFN is related to the formation of national alliances and policy changes among the related mainstream professional associations is imperative concerning impetus to the aforementioned three pillars. The formation of national FFNs has successfully enlarged the meaning of orthogeriatric approach and encompasses the establishment of the national alliances of healthcare associations advocated in the fourth, enabling, political pillar.

Conclusion: Fragility fractures, mainly hip fractures are frequently accompanied with severe adverse clinical outcomes and are costly injuries. Fracture pandemic emerges challenges across all healthcare systems especially in middle and low-income countries. It is therefore an urgency to address this issue with a multidisciplinary approach providing best results. Consequently political and economic initiative will promote integration of excellent quality services in all levels of care contributing in the creation of a welfare community.

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Online exercise in the new era of digital medicine

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So far with the Covid 19 Pandemic 1.48 milion people have died[1]. A prospective study reported that the global hip fracture incidence will increase dramatically with global numbers up to 4.5 million by 2050[2]. The importance of fracture and fragility incidence has a profound impact on general function level and mobility and affects quality of life a huge part of the global population.

Technology led to a revolution on our entertainment, education and of course health. Online physical activity has also become a part of our everyday routine. Several studies support that online physical activity interventions effectively promote and maintain physical activity levels[3,4]. Online interventions are not the future, not even the present, online interventions are the past. For the first time in 2010 the American Telemedicine Association published the first telerehabilitation guidelines[5]. During the 70's the phone communication was used to access patient's physical activity levels, through interviews. With the video revolution during the 80's the exercise plan was given in the form of a VHS or a CD. Nowadays we are talking about a new era, the era of artificial intelligence (AI). Computers can speak, hear, think, learn and if we give them permission they even take decisions for us, such as which route to take to avoid traffic.

For an online exercise session all you need is a fast internet connection and a tablet, phone or PC. Moreover, many companies have produced wireless sensors such as heart rate, blood pressure, electrocardiograms monitors and many more to increase safety while exercising. Home online exercise appears to have increased adherence compared to usual intervention[6] and is at least as effective[7]. Furthermore the cost for a single session of in-home online exercise session compared to conventional home-visit exercise session was lower or about the same, depending on the distance between the participant's home and fitness centre. A favourable cost differential was observed when the participant was more than 30 km from the provider[8]. While studying psychological and social wellbeing, the results indicate that technology-supported online group-exercising which conceals individual differences in physical skills is effective in motivating and enabling individuals who are less fit to train as much as fitter individuals. This not only indicates the feasibility of training together despite differences in physical skills but also suggests that online exercise might reduce the effect of skills on adherence in a social context[9]. Conclusively online home based exercise is not only feasible even for older people but it is also associated with high levels of engagement and participant's satisfaction[10].

Even though many project an ethical dilemma about AI, it can become our reliable fitness partner without undermining traits that are exclusive to humans such as imagination, empathy and intuition. Everybody should have access to high quality exercise services. With online exercise sessions, we are a step closer to that direction, because as stated above it is easily accessible, cheap and effective.

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Orthopaedic treatment of fragility fractures - Postoperative management

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Worldwide, osteoporosis causes more than 8.9 million fractures annually[1] and by 2050 the worldwide incidence of hip fracture is projected to increase by 310% in men and 240% in women, compared to rates in 1990[2]. In the same time, a prior fracture is associated with an 86% increased risk of any fracture[3]. Hip fracture survivors often experience a loss in function with 40% unable to walk independently and 60% requiring assistance a year later. All the above make aboundingly clear the need for optimization of acute and long-term management following a fragility fracture. The aim of their treatment is the speedy return in the patient's pre-fracture condition. However, preexisting conditions (cardiovascular, Parkinson, diabetes, COPD, dementia etc.) influence negatively their outcome. In addition, already deteriorated mobility and functionality as well lack of rehabilitation services, have a negative impact on morbidity, mortality and functional recovery.

Care of a fragility fracture patient is best accomplished collaboratively (orthopedic, geriatrician, nurse, physiotherapist, nutritionist, etc.), utilizing an interdisciplinary approach. Multidisciplinary management was shown to result earlier functional independence, reduced length of stay, and decreased future need of institutional care.

The fracture type is not the only factor influencing the decision for surgical intervention. The condition of the patient, the potential benefit and the possibility of mobilization post operatively are to be considered. The surgical treatment of a fragility fracture is complicated by the poor bone quality due to the age and osteoporosis, increased risk of non-unions, reduced osteointegration of implants, and other factors. Many surgical options are available depending on the fracture, internal or external fixation (for upper extremity), arthroplasties, kyphoplasty/vertebroplasty. All share the same aim, to reduce the morbidity and mortality, provide a stable osteosynthesis with as possible minimally invasive surgery technique to enable early mobilization and weight bearing.

However, the management of a fragility fracture doesn't end in the operative room, it merely starts there! Early and late surgical complications, as well secondary fracture prevention and rehabilitation is of outmost importance.

Wound infection is a serious complication. Host factors that influence its incidence include, diabetes, nutrition, smoking, steroid use etc. Prophylactic antibiotics should be used for less than 24hours. Staff, patient and family education on signs of infection is essential[4].

Perioperative thrombosis is a common event in a fracture patient. Early surgery and early mobilization have been shown to reduce its incidence. Fondaparinux or low-molecular weight heparin for 28 to 35 postoperative seems to be the best evidence-based recommendation[5].

Pain is one of the main sequalae of a fracture and operation. Good control of postoperative pain reduces delirium and improves patient's ability to participate in rehabilitation. Its assessment in the elderly patients can be challenging[6]. Multimodal analgesia is of great importance in the elderly. Opioids may induce delirium, and may have increased cerebral sensitivity to them. Nonsteroidal anti-inflammatory drugs may cause acute kidney injury. Early surgery is likely one of the best ways to decrease pain.

Nutrition is essential in fracture patient care[7]. Generally, patients should be fed orally consisting of small portions with high-caloric content. Recommended discharge Instructions for these patients are: calcium (500 mg) and vitamin D3 (cholecalciferol - 2000IU) supplementation daily; and 1 g/kg/Bw of Protein.

There is a post fracture care gap in secondary prevention for fracture patients. Studies indicate that these patients: fail to be tested and treated for osteoporosis, and go on to break another bone[8]. Secondary prevention methods concentrate on treating osteoporosis, falls other comorbidities management.

Falls assessment is a key component in secondary prevention. Falls in older persons are most often result of multiple impairments as vision, cardiovascular, neurologic, balance, psychoactive medications, home environmental hazards, etc[8].

During the recovery process, different functions recover at different rates. The goals of rehabilitation are: to restore quality of life through mobility, prevent future fractures by preventing falls. Rehabilitation should begin immediately after surgery. This might include pharmacologic and nutritional interventions as well as those involving physical rehabilitation and structured exercise.

The increase in fragility fractures together with the increase in morbidity, mortality and their socioeconomic impact, necessitate a methodically and streamlined management of these patients. A multidisciplinary approach will provide the solution for a tailor-made treatment plan of the optimum outcome of the fragility fracture patients.

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Osteoporotic vertebral compression fractures - Secondary prevention

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Epidemiology and cost

Based on epidemiological data of the European Union (EU), Vertebral Compression Fractures (VCFs) are the most common osteoporotic fractures (23%) (while hip fractures are less frequent (17%)) and may occur in the absence of trauma or after minimal trauma (e.g. bending, turning). The incidence of clinically diagnosed VCFs is 117 per 100.000 person years[1] or 438.750 clinical diagnosed VCFs per year in the EU. After the first VCF, the risk of a subsequent VCF increases by more than 5-fold[2] and is up to 15% the 1st year[3]. In addition, 97,000 hospitalizations of VCFs per year are recorded[4], with 10-30 day average hospital stay and 95.6 average disability days (while for hip fractures 99.1 disability days)[5]. 20% of the patients died the 1st year (30% for hip fractures). The prevalence of VCFs is increasing in EU, as in 2020 23.7 million were recorded, while in 2050 this number is estimated to reach 37.3 million[6]. Finally, we should mention the long-term sequelae of untreated osteoporotic VCFs, which is pain, segmental deformity with loss of vertebra height, progressive deformity (mainly kyphosis), loss of function and rarely paralysis.

Biomechanics

Normally thoracic kyphosis is 20°-40° (T5-T12) and lumbar lordosis 50°-70° (T12-S1). Posterior spinal muscles and ligaments counterbalance the increased bending moment in case of VCF, while osteoporotic anterior spine must resist larger compressive stresses. Osteoporotic changes in bone density and arrangement lead to thinning of vertical trabeculae and loss of horizontal trabeculae in spine. The VCF types are wedge, concave and biconcave fractures. Finally, factors that could affect kyphosis are the increased axial loads and moment arm (TL region), the failure of conservative treatment and osteoporosis.

Diagnosis

The aim is to identify the painful level and the age of VCF, to diagnose osteoporosis or to exclude any low energy fracture, benign process and metastasis. Fracture evaluation has to be based on history and physical exam, plain radiographs, DEXA scan, MRI, CT scan, Bone Scan Tc 99 (in doubtful cases). Regarding MRI, it is the imaging modality of choice [T1 - oedema increased dark signal, T2 - oedema increased bright signal, STIR (Short Tau Inversion Recovery) is the most sensitive with fat marrow suppressed and it increased bright signal].

Non-operative treatment and secondary prevention

The main goals of treatment are pain decrease, kyphosis avoidance, function preservation and avoid a new VCF appearance. In addition to the osteoporosis, sarcopenia and frailty medical treatment, avoidance of weight lifting, extensor spinal-abdominal-gluteal muscles strengthening (by physical therapy PT), increase of extension of hip joints (by PT), improvement of balance in order to avoid falls (by PT) are recommended. The fracture liaison service is crucial in the follow-up of these patients. A 3-point extension spinal brace should be used as well. If using the hyperextension brace after standing-up there is an increase of pain or the fractured vertebra angle is above 10°, then surgery has to be considered[7].

Vertebroplasty vs Kyphoplasty

Vertebroplasty stabilizes the fracture without height restoration and there is high risk of leakage (65%) due to high pressure cement injection. On the other hand, balloon Kyphoplasty is a procedure designed to relieve pain, stabilize the fracture, restore vertebral height (ballon) and reduce spinal deformity. Limited surgical time with local or general anesthesia is needed for kyphoplasty with average one-day hospital stay and the patient returns to normal activities of daily living (no heavy lifting for six weeks) while no bracing is required. Pain relief is observed in 90%, and low risk of leak (10%) due to bone void creation Kyphoplasty contributes especially to decreasing the mean difference of kyphotic wedge angle and risk of cement leakage and increasing the vertebral body height when compared with Vertebroplasty, while radiographic differences did not significantly influence the clinical results[8]. There is no evidence of an increased risk of fracture of vertebral bodies, especially those adjacent to the treated vertebrae, following augmentation with either method compared with conservative treatment[9].

Conclusions: Osteoporotic VCFs are common fragility fractures and have a high socioeconomic burden due to disability. Pain and deformity are the main long-term sequela. Antiosteoporotic medications, bracing and physical therapy are the chief treatment methods. Kyphoplasty is used when pain and deformity are deteriorating. In order to prevent multiple vertebral fractures, doctors must evaluate regularly both the fractures and osteoporosis during treatment.

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Pilot implementation of a primary sarcopenia early detection program and fragility fracture risk screening of the elderly population in primary health care units of Achaia district

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Introduction: It is well established in the literature that the main factors responsible for primary sarcopenia are pro-inflammatory cytokines, low growth hormone, testosterone levels, increased production of oxygen free radicals, malnutrition. Also immobility and lack of exercise plays a significant role. However, recent studies have reported that vitamin C, vitamin D and omega-3 fatty acid supplementations play a key role in the prevention of sarcopenia. The purpose of this study was to raise awareness among the aging population about the importance of regular exercise combined with a balanced diet in the preservation of the walking capacity and self-care ability of the elderly people, through community care programs in primary health care units.

Materials and Methods: In this study, 21 out of 39 participants of which 18 females and 3 males between 57-74 years old, were examined and re-evaluated after three months. The elderly population was overweight, of urban origin and middle socioeconomic status. The participants were evaluated before and 3 months after the modification of their daily diet and a systematic approach of exercises. They received specific exercise instructions which included aerobic and resistance training in order to increase their muscle mass. The physical activity was evaluated on a 2.40 m long horizontal carpet by assessing the gait speed. In addition, the FRAX-score (Fracture Risk Assessment Tool) was used to identify individuals at high risk of fragility fractures. The instructions about dietary supplements included Vitamin D 2000 IU/day, ascorbic acid 1000 mg/day and 1000 mg of omega-3 fatty acids/day (Table 1).

Results: As Table 1 reveals, daily exercises in a systematic way combined with a diet rich in vitamin D, C and omega-3 fats contributes to a better quality of life of the aging population. Moreover, as evident from the increase in gait speed, the walking speed was increased in the physical active elderly people. In addition, making vulnerable population to participate in programs for the prevention of osteoporosis is associated with economic benefits. However, exercise and proper nutrition failed to significantly reduce the ten-year predicted risk of fragility fractures in the elderly. Finally, the patients' compliance with the treatment was rather unsatisfactory, with the instructions for daily exercise being more widely accepted than the daily dietary supplement prescription.

Conclusions: Screening programs for primary sarcopenia and osteoporosis in the elderly population is a means of detecting elder individuals with sarcopenia and osteoporotic fracture risk early, thus reducing health care costs and improving their prognosis. In addition, the implementation of a training program consisting of aerobic and anaerobic exercises as well as the intake of dietary supplements including Vitamin D, ascorbic acid and omega-3 fatty acids may be a feasible and safe primary health care intervention for frail individuals in order to reduce the fracture risk and improve physical activity.

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Table 1. Variables of the aging population evaluated on the date of screening and their percentage of change on the 3 month follow-up.

PATIENT	AGE (years)	BODY WEIGHT BEFORE (Kg)	BODY WEIGHT AFTER (Kg)	GAIT SPEED BEFORE (m/sec)	GAIT SPEED AFTER (m/sec)	PERCENTAGE OF CHANGE IN GAIT SPEED (%)	FRAX SCORE BEFORE (MOF) (%)	FRAX SCORE AFTER (MOF) (%)
1	68	92	90	0,96	1,18	+22,91	20	20
2	74	83	82	0,92	1,28	+39,13	10	11
3	57	93	91	0,84	1,17	+39,28	2,4	2,4
4	70	80	85	0,77	0,86	+11,69	9,8	9,1
5	65	56	54	1,41	1,90	+35,71	21	22
6	60	80	77	0,94	1,20	+27,66	7,7	7,9
7	63	74	74	0,80	1,12	+40,00	5,0	5,4
8	74	67	66	0,82	1,08	+31,70	12	12
9	67	81	85	0,61	0,92	+50,82	10	9,8
10	72	66	59	1,16	0,87	-25,00	15	16
11	57	67	70	0,71	1,05	+47,88	3,9	3,8
12	74	61	65	0,60	0,60	+0,00	27	26
13	72	55	55	0,69	1,26	+82,61	13	13
14	60	75	75	0,65	0,88	+35,38	11	11
15	72	90	90	0,83	1,06	+27,71	3,4	3,4
16	74	63	65	1,12	1,09	-3,00	13	13
17	68	64	64	0,81	1,03	+27,16	15	15
18	60	68	69	0,87	1,30	+49,43	11	10
19	74	60	60	0,56	1,30	+132,14	29	33
20	71	65	65	0,92	1,10	+19,57	19	16
21	64	58	58	0,57	0,93	+63,16	27	29
AVERAGE	67,43	71,33	71,38	0,84	1,10	+36,00	13,58	13,75

(MOF)= Major Osteoporotic Fracture of elderly population under 75 years old.

Prevention of osteoporotic fractures in patients over 65 years by an outpatient clinic based on a multidisciplinary team

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There are important consequences in terms of morbidity and mortality for people over 65 years of age after an osteoporotic fracture[1]. Although prescription of an anti-osteoporotic drug is common practice, this approach is inappropriate not only for the complex needs of this particularly vulnerable population, but also for the prevention of any future fractures. It is well documented that the best way to manage any health-related problem in older people is based on the Comprehensive Geriatric Assessment (CGA)[2], a holistic tool which assesses not only biological components but also functional limitation and psychological burden. Proper evaluation of the CGA needs an interdisciplinary team with expertise in rating must be employed. The team members come from different backgrounds, they may be medical doctors, physical therapists, psychologists, social workers, nurses but also speech pathologists and occupational therapists if needed etc.[3].

Based on all the above in the Rehabilitation Department of Patras University Hospital, an outpatient clinic was established that targets the individual needs of the geriatric patient with the aim to reduce the impact of fragility fractures, both to patients and health care system. The CGA was structured on balance evaluation and falls prevention and is used as the baseline for evaluation and treatment. The protocol is structured as follows:

1. Step one - medical visit, interview, and thorough clinical examination. Prescription of blood test focusing on geriatric pathology that could have bone effects
2. Step 2 - based on the results of blood test, prescription of an appropriate treatment
3. Step 3 -functional assessment by a team using validated screening and diagnostic tools (Frailty/Fried criteria[4]; Hand grip/ Dynamometer; Sarc F; MNA[5]; MMSE; GDS; SPPB; miniBEST[6]; IADL Lawton Brody; Katz Index[7]; FES[8]; Pelma analysis; Fall check list)
4. Step 4 - Joint team meeting to discuss the results and plan appropriate interventions and outcome monitoring

In 8 months, we have assessed 237 patients, who were usually seen only for osteoporosis and related follow up. By performing the CGA the treatment planning changed for 48 of them (20,25%), many of whom had been referred for further examination and consultation with other specialties. We have detected 38 fallers (16%) and 27 (71%) of them underwent a fall prevention program. We also detected the number of fallers that were also frail based on the Fried phenotype, and from the 38 fallers 30 (79%) were also frail. In this special category the compliance rate in fall prevention programs was extremely low, only 4 out of 30 (13,33%) were compliant with the instructions. We investigated the reason of this bad performance for those who needed more the prevention protocols, and the discovered barriers were mainly social (literacy levels, social exclusion, financial restrictions), which need to be considered when designing any intervention. We have concluded that, treating only osteoporosis, in the geriatric population, is not enough for the prevention of a fragility fracture, but we also need to address sarcopenia, disequilibrium, malabsorption, polypharmacy, and extend our intervention beyond a merely biological intervention to incorporate social and psychological variables. The interdisciplinary approach based on the CGA, is an effective and valuable key to unlock hidden and subtle conditions that will interfere with the level of care, but unfortunately, is costly and complex as a setting and not always feasible.

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Principles of anesthesia for patients with fragility fracture

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Fragility fractures (FF) consist a worldwide phenomenon, affecting most commonly old and oldest people. The majority of patients with FF in hip require in- hospital stay and appropriate rehabilitation. Regarding anesthesia care, patients with FF, in particular hip fractures, demand special considerations. The combination of advanced age, frailty, comorbidity and polypharmacy increase dramatically the perioperative risk. Additionally, painful immobilization aggravates trauma-induced stress, resulting in an overall disruption of homeostasis. The aim of anesthesia care is to maintain homeostatic balance, facilitating recovery and reducing perioperative complications. Anesthesiologists as members of a multidisciplinary team, provide perioperative care, which should focus, mainly, on providing adequate perioperative analgesia and enabling timely surgery[1]. Therefore, fracture repair presupposes ensuring analgesia in the preoperative setting, because pain management is considered of great importance. In hip fracture patients, a multimodal analgesic approach is preferred, including peripheral nerve blocks, like fascia iliaca compartment block, femoral nerve block or 3- in- 1 block. Peripheral nerve blocks administered preoperatively, demonstrate additional benefits like decreasing quadriceps femoris muscle spasm, facilitating positioning for spinal anesthesia and offering postoperative pain relief. Peripheral nerve blocks can contribute to opioid- sparing or opioid- free analgesia, demonstrating anti- deliriant effects[2].

On the other hand, the most common dilemma in the decision-making process regarding anesthesia care, is that of delaying surgery in favor of patient's optimization, in order to be "fit for surgery". Currently, timely surgery repair within the first 36 to 48 hours of admission is recommended, however, delaying surgery may

be considered if patient's condition could be sufficiently improved during that delay[3]. For this purpose, a comprehensive preoperative evaluation should be performed, including, among others, the assessment of cognitive function, nutrition and hydration, as well as special medications received e.g., DOACs. Furthermore, preexisting anemia in combination with acute blood loss due to the fracture should be evaluated and treated promptly. Postoperative delirium is a common condition affecting almost 20-50% of hip fracture patients, resulting in increased complication rate, prolonged hospitalization and poor outcomes[2,4]. Early recognition of delirium or any other pre- existing cognitive disorder, using a validated assessment tool, along with appropriate anti- deliriant strategies throughout the perioperative period consist a basic pillar of anesthesia care for hip fracture patients[5]. In parallel with risk stratification and patient's optimization, the informed consent process is one of anesthesiologist's daily concerns, appearing more challenging for patients with cognitive decline or dementia. However, the role of a well- organized multidisciplinary team is crucial at this difficult point[2].

Any type of anesthesia can be used, since no clear advantages of regional or general anesthesia have been observed. In contrary, what is proven to be beneficial is the avoidance of hypotension. Hypotension is associated with an increased risk of complications and mortality, as organ and tissue hypoperfusion is extremely compounding especially for old people. In general, intraoperatively, anesthesia care should focus on maintenance of hemodynamic stability, monitoring of depth of anesthesia, titration of anesthetic drugs and opioid- sparing analgesia. Opioids and drugs with high anticholinergic burden that increase the risk of delirium should be avoided[2,6-8]. After surgery, all patients require adequate pain control, while early mobilization and vigilance for the occurrence of delirium are very important. Anesthesiologists should provide adequate information regarding the anesthetic techniques used and patient's anticipated postoperative needs in order to facilitate rehabilitation and multidisciplinary team's work[2,3].

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The role of Butterfly Bone Health Society in educating patients

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Butterfly Society faces osteoporosis as a family matter, although every age group needs to be approached and educated differently. So, Butterfly Society is able to show the patient education through many ways.

1. Education through online tools:
   - Butterfly's website (www.osteocare.gr) hosts an e-library with a huge variety of informative articles about skeletal health for the whole family.
   - Social media: there is a continuous presence of several informative articles and publications in the Butterfly's social media accounts, in order to keep patients always informed.
   - Youtube channel: informative videos help patients to understand better osteoporosis and skeletal diseases.
   - Live chat: instant chat between patients and Butterfly Society about skeletal disorders.
   - Newsletter: patients can be in touch with the latest news on skeletal health through informative newsletters.
2. Training patients through educational printed material: "Live Better" magazine is a quarterly subscription magazine, where patients can reach the latest news on skeletal health and osteoporosis. Also, Butterfly Society produces continuously informative printed material for patients throughout Greece. There have been produced, printed and distributed more than 100.000 copies of these informative materials.
3. Education via face to face events: Informative events for patients by also providing preventive tests for osteoporosis. The last 10 years Butterfly has offered more than 35.000 free tests for osteoporosis throughout Greece in order to raise awareness for osteoporosis. These tests followed by informative speeches from well-respected scientists. Other social events: The last 15 years Butterfly Society organizes entertainment events such as walks, gymnastic and nutritional events, excursions in order to keep patients together, giving them the chance to exchange experiences on osteoporosis.
4. Education in cooperation with other Organizations: Educating patients is not easy and we are not alone. We are in close cooperation with other organizations such as International Osteoporosis Foundation and Greek Municipalities Network.
5. Membership: Butterfly encourage patients to become members of the Patient Society in order to be part of a big community, which gets informed first about the latest news on osteoporosis and skeletal health.

Educating patients is not easy. It demands patience, loyalty and unconditional giving to every person who faces a chronic disease such as osteoporosis.

The role of musculoskeletal ultrasonography in the diagnosis of sarcopenia

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Introduction: Sarcopenia is associated with a significant functional decline, an increased rate of falls, a higher incidence of hospitalization, a higher mortality rate, impaired ability to perform activities

of daily living, and a high economic burden when untreated[1,2]. Commonly used ultrasound measurements in the assessment of muscle mass include muscle thickness, cross-sectional area, fascicle length, pennation angle, and echo-intensity[3]. Thickness and fascicle length values of medial gastrocnemius muscle have been advocated as alternative measurements for diagnosing/quantifying sarcopenia[4]. Muscle mass prediction equations based on multiple ultrasonographic measurements of muscle thickness have been reported in the literature[5,6].

The Ultrasonographic Measurement of Muscle Thickness in Sarcopenia

Ultrasound is a cost-effective, fast, non-invasive and widely available imaging method that does not expose the person to ionising radiation, whereas minimal staff training is needed to obtain images for basic measurements such as muscle thickness. The reliability of ultrasonography for the assessment of muscle size across a number of limb sites in healthy populations of children and adults is still under investigation.

A recent study on healthy adult volunteers examined geniohyoid, masseter, anterior arm muscles, rectus femoris, vastus intermedius, tibialis anterior and gastrocnemius muscle[7]. The measurements of muscle thickness were performed at baseline and were repeated after 1, 6 and 24 hours, on both dominant (D) and non-dominant side (ND), using transverse (trans) and longitudinal (long) scans. The analysis of the results showed that the reliability of the ultrasonographically measured thickness of head and limb muscles varies, depending on the type of section and side of the body. More specifically the geniohyoid, anterior arm muscles (D, ND, trans, long), rectus femoris (D, ND, trans) and tibialis anterior (ND, trans, long) showed excellent reliability for repeated thickness measurements at 1, 6 and 24h[7].

A study conducted by the Rehabilitation Department of the University Hospital of Patras, from June 2018 until December 2019, investigated which muscles of the head, neck, upper and lower limbs presented ultrasonographically detectable thickness changes in sarcopenic patients[8]. More precisely, the objectives were to define which side (dominant versus non-dominant) and ultrasound section (transverse versus longitudinal) presented the most significant thickness changes in each of the studied muscle groups of the sarcopenic patients and to evaluate the muscle thickness measurement, as a potential predictory tool in sarcopenia.

The participants were assessed according to the EWGSOP2 criteria for the diagnosis of sarcopenia. The handgrip strength was measured by a hand-held dynamometer and the appendicular skeletal muscle mass by DXA. The muscle thickness was measured utilising transverse and longitudinal ultrasound scans bilaterally (Figures 1 and 2).

Ninety-four individuals (27 men and 67 women) with a mean age of 75.6 years (SD=6.6), referred for sarcopenia screening to the Outpatient Sarcopenia Clinic of the Rehabilitation Department of the University Hospital of Patras, participated in this study. The geniohyoid and medial head of gastrocnemius thickness in all sections, and the thickness of the rectus femoris and vastus intermedius, in specific sections, was significantly decreased in sarcopenic patients ($p<0.05$). The ROC analysis of the ultrasound muscle thickness measurements resulted in a significant association with sarcopenia.

The results of this study have shown that the ultrasonographically measured thickness of the neck and lower limb muscles can be used for predicting sarcopenia with high sensitivity and specificity. Specifically, the geniohyoid and rectus femoris (transverse section - non-dominant side) seems to be the most advantageous ones[8].

Future Perspectives

Further research is required to thoroughly investigate the role of ultrasonography as a diagnostic tool for sarcopenia and to validate the optimal cut-off values for the assessment of muscle quantity and quality. Multicentre studies will be needed to standardise the measuring methodology and investigate in which extend it can be used in different ethnic groups, specific population subgroups and on various types of equipment.

The integration of machine learning techniques in musculoskeletal ultrasonography is challenging but promising field[9]. Computer-aided diagnostic systems could help in reducing examination time, while increasing the accuracy of the measurements significantly. Moreover, computer-aided diagnostic systems could be used to acquire objective measurements, allowing for a cost-efficient and large-scale screening of the population. The early detection of sarcopenia in the elderly, particularly in the most vulnerable groups, is of paramount importance.

Figure 1. Thickness measurement of the head and upper limb muscles. The images present the measurements for the geniohyoid muscle (A); masseter in the transverse (B) and longitudinal section (C); anterior arm muscles in the transverse (D) and longitudinal section (E). Images from the archives of the Rehabilitation Department of Patras University Hospital.

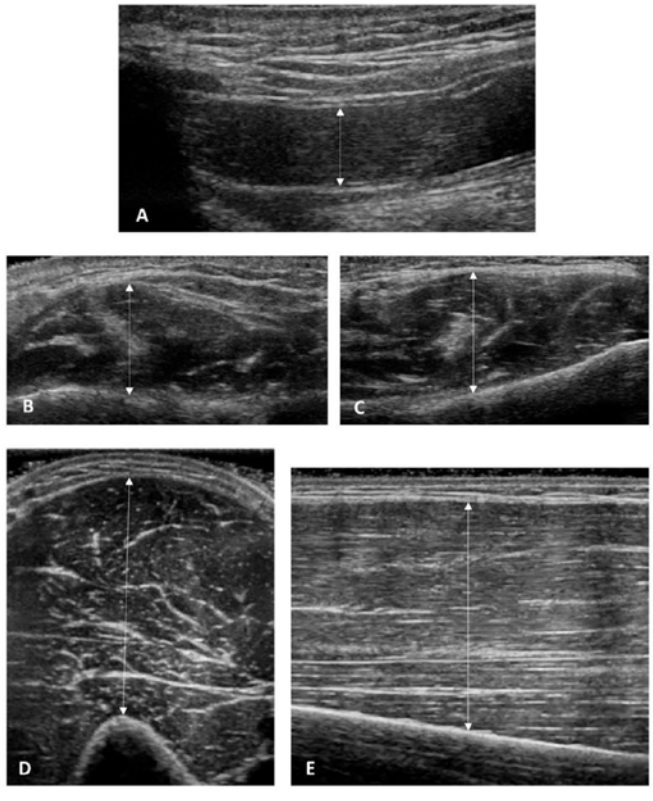
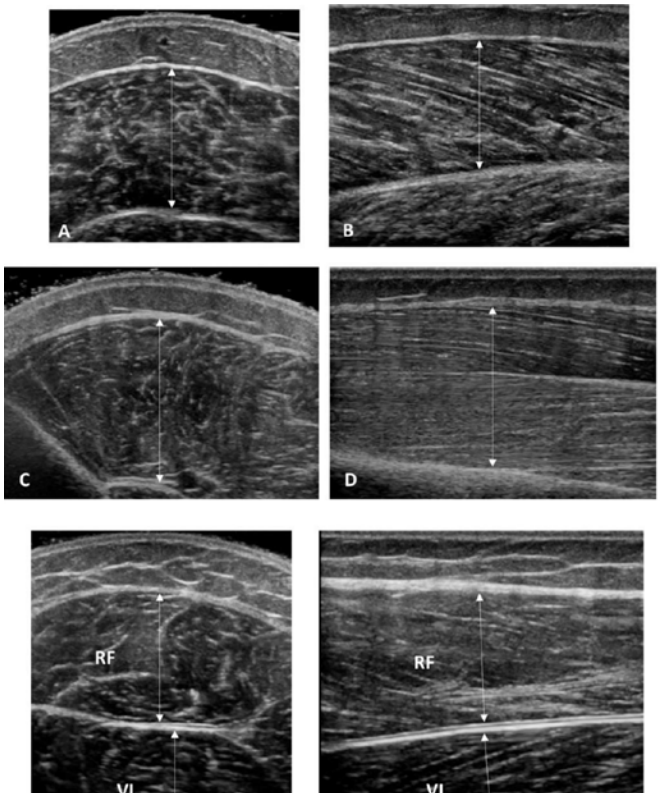


Figure 2. Thickness measurement of lower limb muscles. The images present the measurements for the medial head of gastrocnemius in the transverse (A) and longitudinal section (B); tibialis anterior in transverse (C) and longitudinal section (D); quadriceps femoris in the transverse (E) and longitudinal section (F). RF: rectus Femoris, VI: vastus intermedius. Images from the archives of the Rehabilitation Department of Patras University Hospital.



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The role of the geriatrician in the management of fragility fractures: The UK experience

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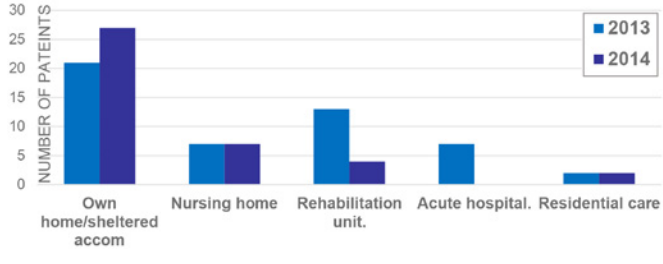
Introduction: In the next 30 years the percentage of the population aged >65 years will increase dramatically.According to the US Census Bureau, by 2050 this will reach 28% or more of the total population in Greece and the majority of European Countries. Furthermore, hip fractures are more than 76,000 per year in the UK, with the cost for Health and Social Services of over £1billion per year.It is well known that the majority of the hip fracture patients are frail; with multiple comorbidities and that post-operative complications and mortality is quite high, reaching 30-50% a year post fracture. In the UK, since 2010 hip fractures are included within the Best Practice Tariff (BPT) scheme, and it is strongly recommended that there is the presence of a Consultant Geriatrician to assess and manage the medical issues of hip fractures patients. The Geriatrician should assess these patients within 72 hours of admission into the hospital.

The Geriatric Service

Geriatricians are Medical Doctors who specialise in the care of the elderly. The ageing population is usually affected by the major Geriatric Syndromes (functional decline and falls, delirium, dementia, incontinence, pressure ulcers and fragility fractures) which can all can be considered under the umbrella of Frailty. Frailty is a medical syndrome with multiple causes and contributors that is characterised by diminished strength, endurance, and reduced physiological function that increases an individual's vulnerability for developing increased dependency and/or death.

The prevalence of frailty is 10.7% in individuals ≥65 years old and increases with age. Frailty is also higher in women (9.6%), than in men (5.2%). The Royal College of Physicians recommends that all people above 65 years old should be screened for frailty. One of the best tools to assess a hip fracture patient for frailty is the Clinical Frailty Scale.Frailty is not only a phenotype, but a condition that influences various systems; especially the immunological and the musculoskeletal system (MSK). Osteoporosis and fragility fracture as well as the muscle mass loss that comes with age and sarcopenia, are the expressions of Frailty of the MSK. Following a hip fracture the patients' frailty increases and as a consequence, patients are more prone to develop delirium, respiratory and urinary infections, as well as other important acute medical complications that can lead to long hospitalisation and can increase their dependency and their mortality.

Graph 1. Milton Keynes Hospital Hip Fracture patients, Discharge Destinati.



The Consultant Geriatrician who works in an Orthopaedic ward (Orthogeriatrician) assesses the patient within 72 hours, possibly before surgery, treats medical conditions and helps the Orthopaedic Doctors to manage the patient. In Milton Keynes University Hospital (MKUH) the presence of the Consultant Orthogeriatrician assisted in

improving the service, with the coordination of the Multidisciplinary Team (Nurses, Physiotherapists, Occupational Therapists, Discharge Coordinator, Orthopaedic Doctors), a therapeutic bundle for hip fractures to reduce pain and the involvement of the Dieticians to the patients' care was formed. In MKUH the presence of the Orthogeriatric Service allowed for the patients to have a more appropriate discharge destination (Graph 1) and reduced the 30 days mortality to 5.2%, in comparison to the 6.5% national average in 2019.

Conclusion: Hip fractures can be a burden for the elderly. It increases their frailty and the post-fracture one year mortality is significantly elevated. The Orthogeriatrician is an important figure for the management of these patients as they can address the geriatric presentations of medical complications, assess for frailty, coordinate the MDT and offer the most appropriate care for frail older patients.

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Using interdisciplinary data to chart Longevity: An illustration for falls

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Introduction: studying longevity

The social and economic impact of longevity is linked to how active '*Young* Old' gradually morph into dependent '*Old* Old'[1]. In this, falls act both as *causes* and as *effects* of frailty, depression, or other dysfunctions.

This transformation is complex, akin to charting an unknown planet - the '*Planet Longevity*'. Understanding it requires interdisciplinary study founded on consistent and internationally comparable statistical indicators. This guards against stereotypes and accommodates the insight that future cohorts will importantly different from their predecessors.

The Survey of Health Ageing and Retirement in Europe (SHARE) is a large, freely available, pan-European panel survey of people aged 50+. It has been in existence since 2004 and has to date collected 8 data waves[2]. As a longevity instrument, SHARE has four advantages:

a. It is interdisciplinary, covering medicine, economics, sociology, or psychology.
b. It is internationally comparable, treating Europe as a notional experimental laboratory.
c. It is a panel survey; the same individuals are interviewed in each wave as they age.
d. It is calibrated to the problems of elders: proxy interviews for those unable to participate, emphasis on cognition, use of biomarkers.

SHARE is a pioneer in Greece, providing some types of data for the first time. As a descendent of the US Health Retirement Survey, it is part of a worldwide family of ageing surveys. Its sample size (84 thousand in Europe, 3800 in Greece) dwarfs other surveys and allows the investigation of research hypotheses spanning disciplines.

Using SHARE to investigate falls

Investigating how falls enter ageing process serves to illustrate using SHARE. Unlike clinical studies, it focuses on people living in the community; international comparability uncovers national differences whose explanation itself deserves study.

Three published studies give a flavour of results.

Komninos et al.[3] use wave 1 data (2004) to define frailty as a composite of physical indicators, to uncover differences by age and country. Almada et al.[4] explain the widely diverging prevalence of falls in wave 6 (2015). Intriguingly, Greece is an outlier, exhibiting the lowest prevalence (3.5%), less than half the overall average (8.2%), a finding repeated by gender and age. They use logistic regression for the *causes* of falls. The large sample size allows them to extract the *separate* effect of factors (controlling for other factors), such as age, gender, polypharmacy, frailty, vertigo or depression. Macklai et al.[5] shift their interest to the opposite causation: how frailty in one wave affects other dimensions of health and well-being for specific individuals two years subsequently (i.e. in the next wave). They find that frail individuals in w1 saw their situation deteriorate two years later in three separate dimensions: Mobility, need for care (ADL) and functioning (IADL), even after controlling for confounders such as age, gender, income or chronic diseases.

Some indicative findings for Greece

To illustrate SHARE's potential, we used wave6 to examine falls. Table 1 reports the prevalence by age for Greece, South Europe and for the entire SHARE sample (17 countries).

Table 1. Prevalence of falls by age and gender, Greece and other countries.

		N	Falls (%) Total	Men	Women	Median age for the total sample
Greece	55-64	1.587	1,8%	1,3%	2,1%	79 years
	65-84	2.333	4,0%	2,6%	5,3%	
	85+	279	13,3%	11,2%	14,9%	
	Total	**4.199**	**3,8%**	**2,7%**	**4,7%**	
South Europe	55-64	5.405	4,1%	2,9%	5,0%	76 years
	65-84	8.988	9,0%	5,9%	12,0%	
	85+	1.205	21,4%	16,5%	25,0%	
	Total	**15.598**	**8,3%**	**5,6%**	**10,6%**	
SHARE Total	55-64	20.982	4,1%	3,1%	4,8%	75 years
	65-84	33.489	8,7%	6,0%	11,0%	
	85+	4.056	20,1%	16,0%	24,2%	
	Total	**58.536**	**7,9%**	**5,6%**	**9,8%**	

Source: SHARE wave 6. South=IT,ES,PT.

Greece is an outlier, for the total and for all subcategories, while the median age of those suffering falls is larger. Intriguingly, Greece seems to be closer to Scandinavia than to Southern Europe. Following Macklai et al.[4] we derived an indicator for frailty and pre-frailty as a composite of five parameters. As expected, falls are closely related to frailty. As prevalence of frailty in Greece is no different, it does not explain fewer falls. However, as frail individuals are *more* subject to falls, the Greek idiosyncrasy lies in *healthy* people being less susceptible to falls - perhaps due to sedentary lifestyles.

Table 2. Frailty and pre-frailty in the SHARE sample by gender.

	Greece		South Europe		SHARE_17	
	Men	Women	Men	Women	Men	Women
Healthy	50,1%	42,7%	49,7%	42,4%	57,4%	47,9%
Prefrail	37,8%	38,0%	37,6%	38,8%	32,9%	37,4%
Frail	12,1%	19,3%	12,7%	19,9%	9,7%	14,7%
Total (n)	**2.115**	**2.555**	**8.084**	**9.584**	**30.345**	**36.569**
% with falls						
Total sample	2,7%	4,7%	5,6%	10,6%	5,6%	9,8%
Healthy	7,7%	4,7%	14.4%	10,4%	20,4%	16,3%
Prefrail	26,9%	37,4%	34,9%	36,1%	38,3%	39,2%
Frail	65,4%	57,9%	50,7%	53,6%	41,3%	44,6%
Total (N)	**52**	**107**	**404**	**896**	**1.147**	**3.174**

Source: SHARE wave 6. South=IT,ES,PT.

A logistic regression was able to explain the prevalence of falls for the entire sample - assigning importance to frailty, health, but also to psychological variables. However, sample size was insufficient for a convincing explanation for the Greek divergence in falls. An explanation our intriguing findings is still wanting.

Conclusion: SHARE as an untapped resource

SHARE is relatively underused in Greece. This is due to difficulties in interdisciplinary research, but also to the difficulties to implement evidence-based governance. Tapping its potential, through cross-disciplinary cooperation, remains a project for the future.

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Visual problems in older people and their association with fractures, falls and fear of falls

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Introduction: Falls are one of the most serious public health problems due to the high prevalence in older people (32-42%), especially after the age of 70. Several studies have linked falls to both visual problems and difficulty in moving in the environment[1-5].

Aim of the Study: The aim of this study was to investigate vision problems and how these can affect the incidence of falls and the fear of falls in older people.

Material-Methodology: The study was exploratory, conducted in cooperation with: a) the Healthy Living Laboratory (an informal networking and action group of the University of Patras, aiming at developing actions to improve the quality of life of people aged 65+) and b) the Young Researchers Program of the University of Patras entitled: "Holistic interdisciplinary approach to the treatment of patients with fragility fractures" (MIS code 5047167). The research took place from January 2020 to March 7, 2020. The population of the study was 190 elderly people of the 3rd Open Care Center for the Elderly of Patras. A sample of 64 individuals, with a history of low-energy fracture or history of falls (59.4%), was selected by screening. The research tools included the Visual Functioning Questionnaire - 25 (V.F.Q-25)[6], which was used in order to investigate visual health-related quality of life, and Falls Efficacy Scale International (FES-I)[7] to assess fear of falls.

Results: Table 1 presents the socio-demographic characteristics of the sample. The majority of the sample were women (78.1%), married (70.3%), with a low personal monthly income (52%), while the mean number of years of education was 7.39 years. 89.1% of the sample wore glasses, 28% had chronic visual problems (cataract, glaucoma, macular degeneration), while 14.1% had undergone eye surgery.

Table 1. Socio-demographic characteristics of the sample (n=64).

	Men (%)	Women (%)	Total (%)
Gender	14 (21,9)	50 (78,1)	64 (100)
Marital Status			
Unmarried	1 (1,6)		1 (1,6)
Married	12 (18,8)	33 (51,6)	45 (70,3)
Divorced	1 (1,6)	2 (3,1)	3 (4,7)
Widow		14 (21,9)	14 (21,9)
Separated		1 (1,6)	1 (1,6)
Monthly Personal Income(n=50)			
Up to 300€		8 (16)	8 (16)
Up to 600€	3 (6)	15 (30)	18 (36)
Up to 900€	4 (8)	7 (14)	11 (22)
More than 900€	7 (14)	6 (12)	13 (26)
	Mean (±SD)	**Mean (±SD)**	**Mean (±SD)**
Educational Level in years (n=64)	8 (4,5)	7,21 (3,31)	7,39 (3,66)

Table 2 presents the results of the study in relation to the subscales of the VFQ-25 questionnaire. The results are compared with the corresponding weighted mean values of a research in the Greek population in relation both to the control group (healthy population) and to a sample with cataract.

These results show a generally good vision-related quality of life in the sample. The problem is mainly located in the negative effect of vision in driving (Mean=23.92). It should be noted that this result is also affected by the fact that 49 people of the sample reported that they do not drive.

In relation to the effect of vision problems on the existence of falls and low-energy fractures, the correlation with the Spearman r index showed that the sub-scale "General Health" was found to be negatively correlated with the number of falls, ie, the higher the values of "General Health" in the elderly of the sample, the more likely they are to have a lower number of falls and vice versa (r= -,390, p=,002<,01).

The same negative correlation was observed with the sub-scale "General vision" (r=-,266, p=,040<,05), with the sub-scale "Near vision''(r=-,289, p=,028<,05) and finally with the sub-scale ''Dependency''(r=-,264, p=,042<,05).

In relation to the existence of fractures, a negative correlation was found only with the sub-scale "Driving" (r=-,314, p=,014<,05), which means, the higher the values in the above sub-scale, the more chances there is no fracture and vice versa.

Table 2. Comparison of mean visual health values (control group and control group with cataract) (n=62).

VFQ-25 Subscale	Mean Sample Value (±SD)	Mean value of control group (±SD) n=29	Mean value in the sample of cataract (±SD) n=18
Genaral health	60,44 (18,10)	80,3 (12,2)	57,8 (19,7)
General vision	72,98 (17,49)	90,7 (12,9)	60 (17,4)
Ocular pain	75,80 (22,84)	89,7 (12,1)	84 (20,5)
Near vision	80,62 (17,92)	96,1 (9,7)	65,6 (26,9)
Distance vision	85,01 (15,50)	96 (7,0)	74,7 (18,5)
Social Functioning	93,01 (13,59)	99,4 (3,1)	84,3 (22,9)
Mental health	80,80 (17,58)	89,7 (10,4)	67,8 (24,5)
Role limitations	80,84 (20,58)	94,8 (12,1)	68 (29,3)
Depedency	93,44 (17,25)	97,7 (7,0)	79,6 (26,4)
Driving	23,92 (19,04)	93,8 (8,0)	75 (35,4)
Color vision	92,74 (14,58)	100 (0)	86,1 (17,6)
Peripheral vision	81,45 (23,92)	95,7 (11,7)	79,4 (28,3)

The correlation of visual health with fear of falls showed that except for the VFQ-25 "Color vision" sub-scale, all the other categories were in a two-way negative correlation with fear of falls, measured before quarantine due to the pandemic. This negative correlation shows that higher values in the sub-scales are associated with less fear of falls and vice versa. The strongest correlation was observed in the sub-scales "Mental health" (r=-537, p<,001), "Distant activities" (r=-521, p<,001), "Near vision" (r=-512, p<,001) and "Ocular pain" (r=-500, p<,001).

Conclusions-Suggestions: The research confirmed that there is a correlation between good visual health and a lower number of falls and fear of falls. Driving-related good visual Health was associated with avoiding fractures in older people who drive. These results are in line with the international literature and reinforce the guidelines of the World Health Organization that recommend regular sensory screening to prevent falls and fractures in older people.

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Working for the future of care: the necessity of Health Literacy

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The concept of Health Literacy

Health Literacy is defined as "the degree to which individuals have the ability to obtain, process and understand basic medical information and services required to make appropriate medical decisions". Health Literacy includes a wide range of skills that, once developed, contribute to better research, understanding, evaluation and use of medical information to make informed choices, reduce health risks and improve their quality of life. According to a model of Health Literacy, Health Literacy is the ability of:

1. Accessing and obtaining health-related information.
2. Understanding health information and extracting clear meaning.
3. Critical consideration of health-related information.
4. Application / use of health related information.

At the core of the model are the skills associated with the development of Health Literacy, namely access (the ability to search and find health information), comprehension, evaluation (ability to think critically, interpret and evaluate information) and the application (use of information for decision making and improving health). Through practicing the above skills, the individual acquires knowledge and skills that allow him to cope with a variety of circumstances and needs. As a patient in the context of health care, as a person who belongs to a group at high risk for a disease in the context of disease prevention, as a citizen in relation to health promotion in family, workplace, community. This process of developing health literacy is not a simple and straightforward process. In general, it is considered a lifelong process that is constantly changing, as the conditions and health needs of the individual and his environment change.

The following are the main benefits of developing Health Literacy on a personal and social level:

- Better knowledge of health risk factors, contributing to better disease prevention. Health Literacy is the strongest predictor of an individual's health compared to income, employment status, educational level and nationality.
- Better compliance with medical instructions.
- Autonomy and active role in the pursuit of physical, psychological and social well-being.
- Development of skills that relate to everyday life and increase of people's control over their health, so promoting health literacy is a critical empowerment strategy.
- Choice of habits that benefit health, awareness of factors that burden it, fewer hospitalizations, claiming of quality health care.
- Improvement of the population health level and significant cost saving for the health system.

Why developing health literacy of older people at risk of falls and fragility fractures?

Despite its benefits, Health Literacy rates are low among European countries. Even higher rates of Health Illiteracy are found in vulnerable social groups such as people with low socioeconomic status, with chronic diseases or older people (75+). Health literacy is one of the main regulators for the health of the elderly, as a lack of health-related knowledge and skills can be a significant barrier to adopting healthy behaviors, prevention practices and better management of common chronic diseases. As the percentage of the elderly in the general population increases, efforts are being made to improve their quality of life so that the increase in life expectancy is intertwined with the maximum possible well-being. This is the term of the World Health Organization "Healthy Aging" (Healthy Aging), ie the process of developing and maintaining the functional capacity of the elderly for a longer period of time.

Hip fractures are a major public health issue due to the increasing incidence and associated high mortality. After the hip fracture surgery, the main purpose of the treatment is to acquire the pre-fracture level of functionality, mobility and social participation. Therefore, there is a need for educational interventions in patients with hip fractures, in order to improve their functional status, quality of life and their compliance with the medical instructions after hospital discharge. Higher health literacy in this group of patients is associated with: a) Less and/or less severe falls through the identification and management of risk factors, personal and environmental, b) Reduction of fear of falls and the relative tendency to isolate and reduce activity that characterizes individuals who are afraid of falling, c) Better compliance with the doctor's instructions and especially the medication instructions, d) Adoption of appropriate health behaviors before and after the fracture or fall, e) Better understanding of the problem and how to deal with it - empowerment of the patient, f) Reduction of the risk of a recurrent fracture, g) More effective management of the physical and psychological consequences of the fall or fracture / better recovery.

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Short Abstracts

Atypical femoral fractures associated with long-term bisphosphonate use. A 10-year retrospective study.

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The purpose of this study was to report the clinical and radiological features and to evaluate the results of surgical treatment of atypical femoral fractures (AFF) associated with long-term use of bisphosphonates (BP). During the period 2006-2016, we retrospectively examined 31 patients with a mean age of 71.2 (60-83) years, who were diagnosed with AFF (N=34, three patients with bilateral fractures) associated with long-term use of BP. The fractures were selected according to the criteria of the American Society for Bone and Mineral Research. All cases were treated surgically. The duration of treatment with BP, the preoperative and postoperative clinical and radiological findings and the occurrence of complications were evaluated. The average duration of follow up was 32.3 (12-72) months. The mean duration of BP treatment was 7.2 (4-10) years. Twelve (35.3%) fractures were subtrochanteric and 22 (64.7%) diaphyseal. Antegrade intramedullary nailing (AIN) was applied to all of them. The average fracture-healing time was 4.8 (2-9) months. In 8 (23.5%) cases there was a failure of fracture healing and AIN was reapplied using a larger diameter nail, resulting in their healing within 4 months postoperatively. Twenty-six patients (76.5%) returned to their preoperative motor and functional status, while 8 (23.5%) patients presented with varying degrees of motor and functional disorders. No other complications occurred. Long-term use of BP is directly related to the development of AFF. Surgical treatment of these fractures is demanding and associated with an increased rate of healing failure and reduced motor and functional capacity of patients postoperatively.

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Designing a holistic interdisciplinary community model of care to improve compliance of patients with fragility fractures through educational and strengthening processes

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The global incidence of fragility fractures is rising worldwide, due to population ageing. It has been estimated that in 2010 there were 21 million men and 137 million women aged 50 years or more at high fracture risk and that this number is expected to double by 2040. Prevention of fragility fractures is of major importance given their negative impact on the elderly's quality of life and the great costs connecting with hospitalization and rehabilitation. The aim of the study was to develop an innovative model for the holistic interdisciplinary approach of elderly over 65 who have a fragility fracture history. The main purposes of the implementation of this model is to prevent recurrent fragility fractures, reduce the factors leading to them and improving the elderly's physical health as well as their quality of life. Through literature review, good practices abroad were studied, as well as Greek efforts made to deal with fragility fractures. The intervention group consisted of 20 people. 95% were women, while the average age was 69 years. 35% had a previous fall and 50% a fracture history. A three-month multilevel, digital intervention programme was designed, including:

- Individual physical exercise
- Nutritional education
- Falls Prevention Training

The sector of physical exercise is based on the multicomponent exercise program called VIVIFRAIL which provides each elderly person with an exercise program according to his/her functional capacity. Nutritional education is based on an individualized nutrition program relying on the Mediterranean Diet standards. Falls Prevention Training is based on the provision of digital material from the Australian Guide of Falls Prevention for older people, adapted to the educational needs of this specific team. To ensure interaction and active participation, monthly activities and group teleconferences have been organized. This model is in the process of implementation and its results will be published.

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Detection of fall risk in general population over 65 years old

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Purpose of survey is to detect people in the community with balance disturbance and to correlate a validated fall risk self-assessment questionnaire with the Time Up and Go (TUG) assessment. Specialized clinic concerning balance problems and risk for falling was organized in Open Care for Elderly Centers. The questionnaire used to the CDC's STEADI Falls Prevention Algorithm was used. It consists of twelve close-ended questions and three of them are key questions. Medical history, neurologic and musculoskeletal examination, TUG assessment and orthostatic vital signs were recorded. 144 people participated, 113 women and 31 men, with average age of 70.36 years. 31.94% scored below 4 at the questionnaire and gave negative answer at the key questions, so they were considered of low fall risk and the rest 68.06% of high risk. 35.41% required more than 12 seconds to perform TUG test, so they were considered of high risk. 47.96% of the participants who had high fall risk according to the questionnaire also had positive TUG test. There were detected 8 people who needed more than 12 seconds for the TUG even though they had low risk according to the questionnaire. We must also mention that 17.36% of the participants suffered from osteoporosis, 24.3% had at least one fracture in the past and 31.25% had at least one fall during the last year. A greater number of people with positive questionnaire rather than positive TUG test was found. Firstly because the sample was not randomized and secondly the questionnaire is a self-assessment tool whereas TUG is a clinical test. Falls in elderly is a major medical issue but the use of specialized questionnaire, assessment tools, detailed medical history and medical examination can in a great percentage detect people in risk and with expertise intervention risk of fall can be reduced.

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Effect of early postoperative administration of bisphosphonates on healing of osteoporotic fractures of the distal radius

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The purpose of this study was to evaluate the effect of early postoperative administration of bisphosphonates on healing of osteoporotic fractures of the distal radius. Between 2011 and 2017, 120 patients (87 women and 33 men) with a mean age of 68.4 (57-82) years, who suffered from osteoporotic fractures of the distal radius, were surgically treated in our clinic using open reduction and internal fixation (locking plates and screws). All of them received postoperative treatment with bisphosphonates (Alendronate 70 mg/week or Risedronate 35 mg/week). In 62 patients (group A) the bisphosphonate treatment was administered immediately (within 2-3 days postoperatively), while in the remaining 58 patients (group B) was delayed (3 months postoperatively). Treatment results on fracture healing for each group were based on clinical/functional (pain or tenderness, grip strength, wrist range of motion, Quick-Disabilities of the Arm, Shoulder and Hand Score - QDASHS) and radiographic (anteroposterior and lateral X-rays - radiological fracture healing time) criteria. The mean follow-up duration was 38.4 (24-60) months. Radiologically, the mean fracture healing time for group A was 3.1 (2.5-4.5) months and for group B 2.9 (2.5-4) months (p = 0.07). After the sixth post-operative month, there was no significant difference between the two groups in improving pain or tenderness in the fracture area, grip strength, range of motion and QDASHS. Conclusively, the early administration of bisphosphonates after surgically treated osteoporotic distal radial fractures does not appear to significantly affect their radiological healing time, as well as the final clinical/functional outcome.

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Elderly patients with hip fractures, treatment for osteoporosis, evidence for sarcopenia and malnutrition. A preliminary report

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Recent literature from different countries has highlighted the fact that elderly patients with bone fragility have not been checked regarding osteoporosis on a regular basis. Furthermore, it has been registered that most of these patients suffer from a wide spectrum of comorbidities. Regarding our country, such data is restricted. Our aim was to investigate the preoperative health status of the elderly patients with low energy hip fractures who were treated in our department, in terms of sarcopenia, malnutrition and a concurrent therapeutic protocol for osteoporosis. We prospectively collected data concerning patients' demographics, possible previous treatment for osteoporosis, the amount of drugs that had been administered, history of previous fracture, body mass index (BMI), serum vitamin D status (vit.D), serum albumin (Alb), serum calcium (Ca), serum phosphorus (P), parathyroid hormone status (PTH) and postoperative 30-day mortality in all consecutive patients. In our study 153 patients were included. The average age was 81.1 years and most of them were female (n:108, 70.6%). Only 18 (7.3%) patients were administered medication for osteoporosis. In 36 (23.5%) patients there was a history of previous low energy fracture and in 9 (8.2%) patients there was a history of cortisone dependent treatment. Multi drug therapy (from 6 to 11 drugs) was registered in 54 patients (35.3%). BMI was less than 25 in 61 (58.1%) patients and vit.D was normal in only 15 (9.8%) patients. Albumin was low (less than 3.5 gr/dl) in 44 (28.6%) patients. In addition, Ca, P and PTH was abnormal in 50.9%, 11.8% and 21.8% respectively.

The 30-day mortality rate was 6.5%. The results of our study underlined the fact that the enhancement of primary and secondary fragility fracture prevention in our region is of primary importance. Consequently, it is essential to establish an orthogeriatric care unit to ensure regular checkups for our patients.

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Falls and fractures. A comprehensive approach from the clinic for the prevention of falls, osteoporosis and sarcopenia (IPPOS) of the University General Hospital of Patras (U.G.H.P.)

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The aim of this study was to comprehensively assess the risk factors for falls and fractures in the study population. During the first visit to IPPOS, in 96 patients women and men, over 65 years, the levels of vitamins D3 (vit.D3) and B12 (vit.B12) were measured, the number of falls in last year (FNLY) as well as fragility fractures were recorded and the ANTICHOLINERGIC-COGNITIVE-BURDEN score (ACBscore) was calculated based on the medical history. Equilibrium was measured with the Mini-Balance-Evaluation-Systems-Test (Mini-BESTest) and the fear of falls (FofF) with the FES-I. Anthropometric measurements and tests of Hand Grip Strength (HGA), Walking Speed (ws), Short Physical Performance Battery (SPPB) were performed and patients were assessed as frail, pre-frail and non-frail according to Fried criteria (Fried Phenotype). The Linear Bivariate Correlation (L.B.C.) did not show any statistically strong correlation between vitamin B12 levels and MiniBest, SPPB, Hand Grip, FNLY, Fried Phenotype, and ACBscore values. In contrast, a statistically negative correlation was found between vitamin D3 levels and FNLY (rs (93)=-0,274, p=0.008) and Fried Phenotype (rs (89= -0.220, p=0.038). The L.B.C between the values of the FES-I index and the values of the following variables showed a correlation with: MiniBest (rs(83)=-.496,p<0.001), SPPB(rs(82)=-0.343, p=0.002), HGA(rs(80)=-.235, p=0.036), W.S(rs(82)=-.510, p<0.001), FNLY (rs(85)=0.236, p=0.030). No significant relationship was found with: ACBscore, Vit.B12, and Vit.D3. Also, the mean value of the FES-I index are not affected by the presence or absence of fractures after the Mann-Whitney test for the FES-I index (Z=-0.214, p=0.831). The relationship between Mini-Best and Fried Phenotype (rs (89)=-0.715, p <0.001) was also statistically significant. Key factors influencing falls in the present study are Vit.D3, the FofF and physical frailty, although the FofF does not appear to be affected by the presence or absence of fractures.

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Functional Fitness MOT (FFMOT) - Assessment tool of physical abilities for the elderly

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Increased physical activities (PA) in older adults can bring substantial health benefits, reduce risk of falls and fractures.

FFMOT is an approach that aims to raise awareness of the importance of components of fitness i.d. strength, balance, flexibility, highlight benefits of PA, engage older people in health behavior change discussions, and direct them to proper activity resources. Prof. Dawn Skelton and colleagues designed this tool at Glasgow Caledonian University in 2011. FFMOT takes approximately 60 minutes/per older person and contains some elements that are actually used in strength and balance training programs, such as sit to stand in 30'', single leg stance, chair sit and reach. FFMOT was mainly developed as a means to provide information and raise awareness of the PA guidelines, particularly the newer strength and balance one's. According to recent PA data, only 14% of men, and 16% of women aged 65-74 years and 12% of men and 5% of women aged 75+ years meet the strength PA guideline[1]. Additionally, sedentary behavior is particularly prevalent in older populations, with an average of 9.4 hours sitting a day[2]. Health professionals play a key role in encouraging older adults to increase their PA. Preliminary observational data from the FFMOT application in Greek elderly indicate that FFMOT is attractive and possibly feasible in the clinical setting. These data are in line with the findings of a recent mixed-method feasibility study[3]. Case reports in Greece provide encouraging signs that older people are expressing positive emotions stating that FFMOT is raising their awareness of the opportunities to become more physically active. Preliminary reports from Greek PTs recording the FFMOT for Greek seniors show that FFMOT can inspire and motivate them to maintain their independence by participating in fall and fracture prevention programs.

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Greek SARC-F: Reliability and validity of the Greek version of the Sarcopenia screening tool in community-dwelling elderly people living in Western Greece

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The purpose of this study was to assess in a sample of community-dwelling elderly people the psychometric properties (reliability and validity) of SARC-F questionnaire, a brief screening tool for sarcopenia. Reliability was assessed by inter-rater and test-retest analyses. Test-retest reliability were tested by the intraclass correlation coefficient (ICC) and its 95% CI. Validity was assessed by sensitivity (Se), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV) in a cohort of elderly Greek subjects using the diagnostic criteria for sarcopenia based on the European Working Group on Sarcopenia in Older People. For the clinical validation phase of the SARC-F, population was divided into sarcopenic and non-sarcopenic ones. The participants involved in this study were recruited from the University Hospital of Patras and the 2nd Open Care Centre of Patras for the Elderly. Ethical approval was given by the Ethical Committee of the School of Health and Welfare of the Technological Educational Institute (TEI) of Western Greece.A total of 197 elderly participants (71.64±7.83 years, 68.5% women) were analyzed in the clinical study. The translated Greek version of the SARC-F demonstrated an excellent inter-rater reliability, with an intraclass correlation coefficient (ICC) of 0.91 (95% CI 0.79-0.96), as well as excellent test-retest reliability, with an ICC of 0.93 (95% CI 0.91-0.95). The results showed that sensitivity of the tool was 22.9 %, and the specificity was 7.9%. Positive predictive value was 12.91% and negative predictive value was 97.8%. Results show that the SARC-F questionnaire may considered a suitable tool for community screening for sarcopenia.

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Levels of vitamin D in patients with osteoporotic vertebral fractures: a retrospective one year study

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Vertebral fractures are very common manifestations of osteoporosis, with one occurring every 22 seconds in patients over 50 years of age. They are associated with an eightfold increase in mortality and morbidity such as back pain, height loss and immobility. Vitamin D deficiency has been identified as a contributing risk factor for osteoporotic fractures. The aim of this study was to evaluate the levels of vitamin D (25-OH-D) in patients with osteoporotic vertebral fractures. During the calendar year 2017, 56 patients (37 women and 19 men, mean age 74 years) were admitted to our clinic for osteoporotic vertebral fracture (25 thoracic and 31 lumbar). At admission, they were tested for 25-OH-D levels and risk factors for hypovitaminosis D. None of the patients was receiving vitamin D supplements upon admission. Twelve (21%) patients were found to have 25-OH-D levels below 10 ng/ml, 33 (59%) patients between 10 and 30 ng/ml and 9 (16%) patients above 30ng/ml. There was no statistically significant difference in the levels of 25-OH-D between male and female patients. There was no correlation between the fracture site and 25-OH-D levels. Forty-seven (83%) patients had at least one risk factor for hypovitaminosis D. Conclusively, Vitamin D levels are correlated with osteoporotic vertebral fractures. Identifying patients with risk factors for hypovitaminosis D along with vitamin D supplementation might reduce the incidence of osteoporotic vertebral fractures.

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Managing peritrochanteric fractures in renal dialysis patients. Morbidity and mortality rates and complications

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Patients with end-stage renal failure who are on chronic haemodialysis and suffer a neck of femur fracture have been shown to have increased morbidity and mortality rates[1,2,3]. The aim of this study was to examine the mean hospital stay, the blood transfusion rates and the morbidity and mortality of renal dialysis patients who suffered a neck of femur fracture. We conducted a retrospective study, during the years 2015-2019. Twenty patients that were on dialysis were included in the study (10 patients had suffered intracapsular and 10 patients extracapsular proximal femoral fractures. Nineteen patients were surgically managed (mean time to surgery 68.8 hours) and one patient deceased prior to surgery. The mean hospital stay was 23.95 days (6-82 days). The total need of blood transfusion was 86 units of RBC (4.3/patient) and 11 units of FFP (0.55/patient). No mechanical failure was observed in the fixation group. The inpatient mortality rate was 30.0 % whilst the one-year mortality rate was 45%. Post-operative complications, included, haematoma of the wound in five patients, transient ischaemic attack in one patient and NSTEMI in two patients. One patient who developed haematoma was taken back to the operating theatre for washout and debridement of the haematoma. (infected haematoma). Managing end stage renal dialysis patients who have suffered neck of femur fracture is always a challenge. Bleeding, infection and increased blood transfusion requirements are the most common complications noted. The mortality and morbidity rates are significantly higher when compared to a non-dialysis group. A multidisciplinary team approach is required in order to improve the outcome.

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Periprosthetic Vancouver B type femoral fractures treatment with a long femoral stem: radiological and clinical outcomes

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The aim of this study was to evaluate the radiological and clinical outcomes of treatment of Vancouver B type periprosthetic femoral fractures (PFF) with a long femoral stem (LFS). We conducted a retrospective study of 16 patients with a periprosthetic Vancouver B1, B2 and B3 fracture that were admitted in our department between 2016 and 2018 and treated with a LFS revision. All patients were followed up at 1, 2, 3, 6 and 12 months postoperatively. Their radiological evaluation was based on plain X-Rays using the Beals and Tower's (BT) criteria and their clinical evaluation on Visual Analogue (VAS), Harris Hip Score (HHS) as well there incidence of complications. Out of the 16 patients, 12 were female and 4 male. Ten fractures were around a total hip arthroplasty (THA) and 6 around a hemiarthroplasty (HA). Their mean age was 74 (58 to 83) years. Three fractures were classified as Vancouver B1, 6 as B2 and 7 as B3. All fractures achieved union between 2 to 8 months (mean 4 months) postoperatively. The BT criteria were excellent in 5 patients, good in 8 and poor in 3. The mean VAS at 2 months after the fracture was 34.2 in comparison with 65.2 at one week after the fracture. The mean HHS postoperatively was 71.3. All patients survived until the end of the follow up. Three (18,7%) patients had a major complication and 6 (37.5%) a minor one. None of the patients required a further operation. Conclusively, Vancouver B type PPF are a major complication of THA and HA and their treatment still remains challenging. Optimization of the surgical treatment and postoperative protocol is needed for the optimum outcome.

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Polypharmacy and falls in seniors with hip fracture in Greece

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Polypharmacy is closely related with elderly's falls, while falls are associated with increased morbidity, mortality, undesirable events, unplanned admissions to emergency departments, whereas fear of falling leads to isolation and resignation. The aim of the study is to investigate the possible association of polypharmacy and falling among older patients. We randomly selected 61 elderly patients (51 women, 10 men) with an average age of 83,39 years, who were hospitalized in our clinic for hip fracture due to falling. As control group, we randomly selected 60 patients (38 women and 22 men) with an average age of 72,98 years, who were hospitalized in our department for degenerative diseases. In the hip fracture group, we had 4,77±2,9 drugs per day per patient, while in the control group the average was 3,6±1,85. It is worth noting that only 31,1% of patients with hip fracture received less than four medications, while the subjects in degenerative disease group only 41,7% received four or more medications. Hip fractured patients are closely related with falls, as the hip fracture is a consequence of at least one fall. It is worth noting a trend we have seen for polypharmacy of all patients. The correlation of the number of drugs consumed of each group showed a p-value of 0,085, a value very close to statistical significance and this should be noted. Several studies have linked polypharmacy with falls and for this reason polypharmacy until 2000 was considered as an independent risk factor for falls. However, more important seems to be the type of drugs that potentially can cause falls like anticholinergics or sedatives. Elderly people who receive more than three drugs or drugs that induce falls should be considered as "candidates" for fall and should be properly recognized and consulted.

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Primary medical challenges of treating patients with fragility fractures in the rehabilitation setting

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The aim of this study was to identify the main medical issues that physicians face when treating patients that have suffered from a fragility fracture whether the patients reside at home or in an inpatient rehabilitation facility. We performed bibliographic research of the last 10 years in the scientific search engines: "PubMed", "Google Scholar", "Uptodate" and "Cochrane Library" using the words: "rehabilitation" and "fragility fractures". It was found that medical management predominantly includes pain management, pressure ulcer prevention, anticoagulation, nutritional supplements, and delirium prevention and appropriate treatment. Other probable issues include anemia, constipation, and urinary tract complications. It was also documented that within the first month after the discharge from hospital in patients with a hip fracture, readmission rates were 14%, with pneumonia the most frequent reason. Specific co morbidities, such as fluid and electrolyte disturbances, cardiac arrhythmias, congestive heart failure, and chronic obstructive pulmonary disease, are associated with a high rate of readmission. In conclusion, pain management, pressure ulcer prevention, thromboprophylaxis, nutrition and delirium prevention and treatment were highlighted as the most common medical concerns in patients with fragility fracture during the rehabilitation phase.

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Quality of life of frail elderly living in the community

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Geriatric frailty is an age-related syndrome characterized by increased vulnerability and decreased physical well-being and activity. The decrease in strength, endurance and functionality is accompanied by increased susceptibility to stressors and dependence in simple or complex activities of daily living. The aim of this study was to investigate the relationship between quality of life and frailty in older people. In particular, risk factors that may contribute to the occurrence of frailty syndrome have been studied. 100 people (54% men) aged 65 and over participated. The questionnaire formed for this study included questions about the participants' socio-demographic data, medical history, habits and autonomy in their daily life, the short version of the World Health Organization Quality of Life Questionnaire and the Simple Frailty Scale for the detection of frailty. The majority of the elderly in this study were categorized frail (57%) or pre-frail (27%). Significant risk factors for the occurrence of frailty syndrome and the consequent deterioration of quality of life in the elderly were older age, low level of education, other chronic diseases, polypharmacy, low income and non-urban living. The immediate consequence of the ineffective management of frailty was the deterioration of the quality of life of the elderly, which is multidimensional, as the negative impact was on their physical health (r=-,465 ,p<0,05), mental health (r=-,365, p<0,05), social relationships (r=-,240, p<0,05) and functionality in the environment (r=-,279, p<0,05). Frailty had a restrictive effect on the autonomy and functionality of older people, a negative effect that significantly affected their quality of life. Frailty and pre-frailty are health conditions with an increasing incidence in the elderly population. With comprehensive prevention, it is possible to improve the quality of life and maintain the physical, mental and social functioning of older people for a longer period of time.

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The effect of femoral nerve block on the length of hospital stay for hip fracture patients

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Adequate perioperative analgesia in hip fracture patients contributes to lower morbidity rates and reduced length of hospital stay (LOS)[1]. Perioperatively, peripheral nerve blocks provide sufficient, opioid- sparing analgesia, reducing the risk for postoperative complications. Femoral nerve block consists one of the analgesic methods of choice for hip fracture patients[2]. The aim of the study is to investigate the effect of continuous femoral nerve block on LOS, regarding hip fracture patients. This is a prospective randomized clinical trial, including 30 patients (n=30) with fragility fracture of the hip. All patients were randomly allocated, equally, into two groups: group CFNB and group CONV. Patients of group CFNB (Continuous Femoral Nerve Block) received continuous femoral nerve block using neurostimulator, at the Emergency Department within 4 hours after the diagnosis, while the catheter remained for the first 24 hours postoperatively. Patients of group CONV (Conventional) received parenteral opioid and non- opioid analgesics (paracetamol, tramadol). LOS for all patients was recorded, defined from the day of surgery until the day of discharge from the hospital. Group CFNB reported lower mean LOS (10.86±2.99 days) with a maximum value of 19 days and minimum of 6 days, while group CONV reported mean LOS 13.06±7.06 days (max=37 days/ min=7 days). In conclusion, continuous femoral nerve block is considered to be an effective analgesic technique for hip fracture patients during perioperative period, demonstrating positive effects on LOS.

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The impact of timing of surgery after hip fracture on patient outcomes

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Hip fractures are a major public health concern in the older population. The high incidence rate and the usually delayed management are followed by increased complications and mortality. One main reason for delay is the use of antithrombotic agents. Aiming to evaluate the impact of timing of surgery and the use of antithrombotics in the postoperative course and mortality, we retrospectively studied 130 hip fracture patients, managed by the 5th Orthopedic Clinic of our hospital within a year. Demographic data, the use and type of antithrombotic drugs and the timing of surgery after entrance to the hospital (<48h hours, 48-72 hours, >72 hours) were recorded. Using these data we studied the length of hospital stay (LOS) and the mortality rate 3 and 6 months postoperatively. Mean age of patients was 82±9,5 years. 77,7% of the patients were females. 50 patients (38,5%) received antithrombotics, 39 of which, were operated after 48 hours. 28 patients died (21,5%), 2 of which (1,5%) immediately postoperatively, 4 (3%) within three months and 22 (17%) within 6 months. It is noteworthy that 82,1% of

patients that died, were operated later than 48 hours, and 71.4% of them used antithrombotics. LOS was increased proportionally to surgery delay (4,4±0,7 versus 5.4±0,9 versus 5,6±0,9 days for surgery <48 h hours, 48-72 hours, >72 hours respectively). Our study had some limitations, being retrospective and making no clear whether increased mortality was due to surgery delay or severe preexisting health issues. So we conclude that delay of hip fracture management for more than 48 hours could increase mortality and LOS. The use of antithrombotics should not lead to delay of definite management. So, "the bad news is time flies. The good news is that we are the pilot" (Michael Altshuler).

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The perioperative utilization of the tranexamic acid in patients with hip fracture

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Hip fractures occur usually among the general population. The vast majority are treated operatively and may result in considerable blood loss. It is valuable to establish a worthwhile perioperative approach. The fundamental purpose of this study was to identify if the use of the tranexamic acid (TXA) could reduce the transfusion rate in patients undergoing an operation for fragility hip fractures. One hundred and sixty seven patients with hip fractures met the inclusion criteria. In those with extracapsular fractures we used intramedullary nails and those with femoral neck fractures underwent hemiarthroplasty. The data was prospectively collected. The principal outcome was the perioperative serum haemoglobin decline. This was estimated as the deviation between preoperative and final postoperative serum haemoglobin. This study further included the demographic characteristics, the type of fracture based on a variety of classifications, the transfusion rate and the related complications. From the 167 patients, 83 patients were registered with intertrochanteric fractures, 67 patients with femoral neck fractures and 17 patients with subtrochanteric fractures. Tranexamic acid was locally administered in 69 patients and the transfusion rate was calculated. The transfusion rate was significantly lower ($p<0.05$) in intertrochanteric group (36.4% vs 44.0%) and in subtrochanteric group (33.3% vs 50.0%). On the other hand the difference was not statistically significant in the femoral neck fractures' group ($p>0.05$). Regarding postoperative complications, such as clinical pulmonary emboli and clinical deep vein thrombosis, no statistical significance was recorded. The postoperative complications and transfusion rate were considerably lower in patients with locally applied TXA. We consider that the perioperative local administration of TXA may be essential for reducing the postoperative blood transfusion and consequently precipitate rehabilitation for patients with hip fracture, especially those with extracapsular hip fractures.

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The relationship of hand grip strength and knee muscle strength with common functional measures in elderly patients with sarcopenia

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The aim of this study was to examine the comparative association of upper (grip strength) and lower extremity strength (knee strength) with common functional measures used in the identification and assessment of sarcopenia. The study participants were 60 elderly patients (52 female, 8 male) with sarcopenia. Body composition was determined using bioelectrical impedance analysis (Tanita BC 601), handgrip grip strength (HGS) was measured using a standard hydraulic hand dynamometer (Saehan). An isokinetic dynamometer was used to assess lower extremity strength (Biodex). Knee extensor and flexor strength was assessed at isokinetic speeds of 90°/s and 180°/s. Physical performance was characterized using gait speed, via the 4 meter test, the timed up and Go test (TUG) and the timed sit to stand test (5 repetitions). Signed informed consent was obtained from all study participants prior to data collection. Ethical approval was given by the Ethics Committee of the School of Health and Welfare of the Technological Educational Institute (TEI) of Western Greece. The age range within the study sample was 65 years to 84 years (mean age 72.64±7.23 years). There was a fair association between left extension knee muscle strength (180°/sec) and fast gait speed ($r=0.48$, $p>0.05$). Overall, lower extremity muscle strength values had the strongest associations with participant functional performance. HGS was associated with left flexion knee muscle strength (180°/sec) ($r=0.5$, $p>0.001$) and right extension muscle strength (90°/sec) ($r=0.49$, $p>0.05$). However HGS was not significantly associated with the other outcome measures. Significant associations were found between most measures of lower extremity strength and functional performance. Lower extremity strength testing may provide additional guidance regarding assessment and clinical management of sarcopenia.

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Vitamin D deficiency and its correlation with hip fracture severity in seniors in Greece

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Several studies support that vitamin D levels are associated with hip fracture severity. This cross-sectional study included 61 consecutive individuals over 65, with mean age 83.39, admitted to authors hospital for osteoporotic hip fracture over a year. Demographic data, fracture type, fracture severity were evaluated and 25-hydroxy vitamin D was measured. Fracture severity was defined as grade 3 or 4 (Garden classification) for subcapital and A2.2, A2.3 and all A3 (AO/OTA) for intertrochanteric fractures. Extracapsular hip fractures predominated, after being found to be 44/61. Men had mainly intertrochanteric fracture (9/10), while women in 30% of cases had subcapital (15/50) fractures. We found out that intracapsular fractures (8,09±4,74 ng/ml) are associated with more severe vitamin D deficiency compared with the intertrochanteric fractures (9,3±8,5 ng/ml). The severe hip fractures were 40 of 61 (65,6%). The vitamin D levels in patients with severe fracture were 8,1±7,6 ng/ml, while in cases with not comminuted fractures the vitamin D levels were higher (10,7±7,4 ng/ml). It is noteworthy that 31 out of 40 cases (77,5%) of severe comminuted fractures revealed vitamin D levels less than 10 ng/ml. On the other hand, the group with stable hip fractures had 47,6% of cases with vitamin D more than 10 ng/ml. Correlation between fracture severity and status of vitamin D levels according to Horlick classification (<10 ng/ml, 10-20 ng/ml, 20-30 ng/ml, >30 ng/ml) with Spearman's equation is very close to statistical significance, as the p-value was found to be 0,059. Although, vitamin D levels are not very different between patients with intracapsular or extracapsular hip fractures, a more severe vitamin D deficiency seems to be associated with more severe osteoporotic hip fractures. A prior vitamin D supplementation could restrict the severity of these fractures. Comminuted fractures are associated with fixation difficulties rehabilitation restrictions and finally functional disability.

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Evaluation of patients profile who have had hip replacement surgery during 2016 in the Orthopaedic ward of Patras university hospital

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Introduction: Hip fractures are one of the most serious public health problems as they result in high morbidity and mortality. There are numerous risk factors that lead to hip fractures, such as osteoporosis, comorbidity and among them there are factors with a deleterious effect on bone. This study is a systematic evaluation of patient's profile who have suffered a hip fracture.

Objectives: The aim of this study is to determine the characteristics of the patients who have suffered a hip fracture.

Methods: The sample of the study consisted of 68,4% women and 29,7% men, with a mean age of 82 years old who were admitted and had undergone a hip replacement surgery during 2016 in the Orthopaedic Ward of Patras University Hospital. The criteria used for the evaluation were the following: age, gender, comorbidity (according to ICD 10) and polypharmacy (the use of 5 and more medicines). Data were analyzed using the Statistical Package for Social Sciences and by performing Anova test.

Results: The statistical analysis of the results indicate that the mortality risk increases by 90% to patients above 60 years old. Women with a hip fracture who are more than 50 years old have a mortality risk of 30,84%, whereas the same risk for men is 25,53%. Less than one third (28,5%) of the patients die during the first year after the fracture. Most of the patients (80% and more) had at least one comorbidity (according to ICD-10) and 70% of them were under pharmaceutical treatment with at least one medicine. Our findings suggest that comorbidity, age, gender and polypharmacy are strongly associated with morbidity.

Conclusion: The systematic evaluation of risk factors such as comorbidities and polypharmacy are important for the assessment of the subsequent risk of fracture and for the better management of hip fracture patients.

Mortality, complications and quality of life one year after the hip fracture

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Introduction: Hip fractures are low energy injuries with significant morbidity and mortality to the individual. Furthermore, they carry a substantial burden to the health and social services. The associated 6-month mortality is 50% and 12-month is ranging from 14 to 58%.

Aim: The aim of our study was to conduct an epidemiological study of hip fracture mortality in the elderly (>65 years), their immediate and distant complications (thrombosis, pulmonary embolism, infection, pressure ulcers and new fracture) and the impact on the quality of life for the 1st year.

Material and methods: Patients suffering from hip fracture were enrolled during the period from 1/7/2016 to 30/6/2017 with a minimum follow up of 12 months. The data were collected, retrospectively from notes and semi-structured interviews of the patients or their main carers (usually first-degree relatives). The semi-structured interviews were conducted a bespoke questionnaire in conjunction with the standardized SF-36 quality of life questionnaire.

Results: The total number of patients admitted to the Orthopedic Clinic of Patras General Hospital over the inclusion period (1/7/2016-30/6/2017), with hip fracture was 204. Of all responders (N = 132), the mean age was 83.9±9 years.73.5% were women and 26.5% were men.24% (n=32) were treated with non-surgical treatment, mainly due to serious concomitant problems or refusal of the patient or his environment to operate. Of

these patients 75% (n=24) died. Of those who underwent surgery, 25.74% died. The total mortality of patients admitted to the hospital was 37.6%. 31 patients (23.3%) developed an infection. 4.5% of patients developed venous thrombosis of the lower extremities while 2.25% developed pulmonary embolism. The incidence rate of 2nd fracture was 13.5%. Finally, the average values of most quality of life -related parameters were low.

Conclusion: Because of hip fracture's serious implications, both for the individual and for the society, it is understood that the initial interventions should aim targeted towards prevention. This could be achieved by reducing bone density decline in the elderly population, by means of screening tests for osteoporosis, and by appropriate treatment.