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Physical rehabilitation after hip joint dislocation in the elderly

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Abstract

Introduction: Hip joint injuries often have complex and multifactorial causes. Therefore it is so important to apply a properly adjusted physical therapy to each patient. It is especially important in case of older people, where in addition to regular force based trauma, there may exist a number of degenerative changes to the hip joint associated with the aging of the body. Aim The aim of this article is to review the available hip joint injury physical rehabilitation methods, including the newest physical rehabilitation trends. An assesment of the effectiveness of the discussed rehabilitation methods is also carried out in this paper.

Material and methods: Articles in the EBSCO database have been analysed using keywords: injuries of the hip joints, dislocation of the hip joint, modern methods of rehabilitation, older people.

Results: The most common type of hip injuries in elderly patients are proximal femur fracture, trochanteric fracture and femoral neck fracture. In case of such fractures the main choice is usually surgical treatment, therefore it is important to start the rehabilitation process as soon as possible to allow for a quick recovery of the joint. Anticoagulant therapy is introduced within the first 24 hours after the surgery. Verticalization and learning to walk is introduced in the following days, where it is crucial to strengthen the muscles. In later stages exercises with partial and full weighing of the limb can be introduced. Physical exercise therapy is proven to be effective in returning the geriatric patient to full mobility or improving his locomotor functions. Physiotherapy, i.e. hydrotherapy, balneotherapy, magnetotherapy, thermotherapy and laser therapy, can also be introduced for faster tissue regeneration and pain relief. An important element of the post-operative stage is educating the patient about post-hospital life, i.e. principles of safe behavior at home, his limitations and the gradual introduction of physical activity.

Conclusions: The hip joint through its location, structure and function is one of the most common locations of degenerative changes and injuries in the overall population. It is particularly important in elderly people, due to degenerative changes associated with the aging of the body. Rehabilitation after hip injuries should be started as soon as possible after its occurrence. It is important to remember that geriatric patients are specific, due to various limitations, i.e. multimorbidity, polipharmacotherapy, frailty, deafness, amblyopia, sarcopenia and others. Therefore it is necessary to personalise rehabilitation process to best fit to each patient.

Keywords: injuries of the hip joints, dislocation of the hip joint, modern methods of rehabilitation, older people

Introduction

Injuries of the hip joint, mainly dislocations and fractures, are most often caused by the influence of a large external force on the joint. They are accompanied by sports injuries and traffic accidents [1]. Their causes are often very complex and multifactorial, because they are affected, for example, by age, body mass and comorbidities. Depending on the mechanism of injury, physical rehabilitation should be adjusted individually to the patient. Each injury has its own specificity of consequences that may affect muscles, bones, ligaments or tendons. When carrying out rehabilitation of the elderly, it

should be remembered about the appropriate dosage of effort, and also about starting from a series of short exercises, gradually moving to longer and more burdensome efforts [2].

Rehabilitation after hip injuries should be started as soon as possible after the event. Periods of immobility and staying still increase the risk of muscle atrophy, as a result of which the muscular strength of patients decrease. In addition, inactivity contributes to the formation of degeneration of the articular cartilage and the fragility of the ligaments. Therefore, the key point to treat hip dislocation is how to prevent complications [3]. The task of physiotherapists is to stimulate the muscle pump and improve the work of the cardiovascular system through exercises included in the kinesiotherapy and to conduct physical therapy treatments that have analgesic and anti-inflammatory effects.

The time frame for rehabilitation is not the same for everyone. Each patient may need their own time to fully regain their fitness. Therefore, it is worth for physiotherapists to pay attention how to think non-schematically. During the assessment process, it is important to determine the patient's level of understanding regarding the pathology, the goal expectations, and the time frame for achieving them [4]. Notifying the patient about the details of rehabilitation often helps in finding an additional motivation to cooperate with a physiotherapist. It should also be remembered that improving older people brings not only health benefits, but also psychological. Movement rehabilitation has a beneficial health effect, enabling the so-called „successful aging" [5].

Results:

1. **Causes and mechanisms of hip joint injury**

The hip joint through its location, structure and function is one of the most common locations of degenerative changes and injuries in the population. They are particularly important in people over 60 years of age. This is mainly due to degenerative changes associated with the aging of the body [6] . The basic mechanisms of its elimination include:

- adhesive wear - it occurs at low slip speeds or high static loads. Appears on the vertices of inequality joint cartilage or in areas where the articular load is maximum.
- abrasive wear - occurs due to the interaction of solid particles including particles
cartilage that broke from the ground, which can be extracted in the synovial fluid
- fatigue consumption - occurs during excessive exploding and
multiple elastic deformations, in which the articular sinus plays the main destructive role.
- wear due to traching of cartilage - is the result of simultaneous action of tribological processes and pathological changes of synovial fluid, as well as biological changes in the joint cartilage itself [7, 8].

One of the consequences of degenerative processes is osteoporosis - the human skeleton disease associated with its excessive fragility. One of its most characteristic features is asymptomatic - the disease is revealed only as a result of a low-energy fracture. The fracture of the proximal femur, apart from fractures in the wrist and spine, is one of the most common complications of this disease. In contrast, intertrochanteric and subtrochanteric fractures belong to the characteristic consequences of so-called "senile osteoporosis" [9].

Another of the mechanisms of hip injuries is osteoarthritis of the joint - coxarthrosis. There are two basic causative groups of degenerative changes - deforming the hip joint. Primary coxarthrosis, when it is difficult to identify specific causes of pathogenesis, and secondary, when it is caused by diseases includes:

- congenital defects of the joint - for example, hip dysplasia which is characterized by displacement of the head and femoral neck to the side - the withdrawal symptom (disruption of the Calve line) and displacement of the head and femoral neck up (disruption of the Shenton - Menard line) [6, 10],
- disorders of the joint growth and development period,
- post-traumatic changes,
- previous inflammatory processes,
- reduced joint endurance due to hormonal disturbances, systemic diseases or sterile osteonecrosis of the femoral head
- cancerous changes [7, 11].

Due to radiological changes, osteoarthritis of the hip may be divided into:

- protectoric corticosteroids - their most characteristic feature is a deepened acetabulum with its lining
- corticosis with the destruction of the femoral head
- coksartrozy associated with acetabular dilation
- hyperosteotic corticosteroids - associated with a large number of bony pathological changes - osteophytes
- mixed corticosteroids [6, 10]

Other common causes of hip injuries are environmental and random factors. Obesity, hypokinesis and other comorbidities commonly encountered today often accompany these injuries. The low Tinetti test result and associated falls of older people and neurological patients with prevalent symptoms such as paresis, hemiplegia, deep sensory disturbances or body schema complications due to hip injuries often significantly impede rehabilitation [11, 12].

2. Epidemiology of hip joint injury in Poland and in the world

In Brazil Institute descriptive cross-sectional study based on interviews and involving 43 patients who suffered traumatic hip dislocation was conducted. The mean age of patients was 34.4 years old and 90.7% were male. Regarding the mechanism of injury, 95% involved traffic accidents. The posterior dislocation of the hip was the most common injury (93%). Associated lesions were observed in 74.4% of patients, hip fractures being the most frequent. The time span between accident and dislocation reduction was less than 6 hours in 37.2% of patients, between 6 and 12 hours in 32.5% and over 12 hours in 30.3%, ranging from 1 hour to 15 days. A fraction of 90.7% of patients was submitted to closed reduction [13].

According to British studies, the percentage of fractures in the hip acetabulum is 3 cases per 100,000 persons per year [15,19]. Data from Australian registers show that the percentage of fractures in the pelvic rim bones is 23 cases per 100,000 inhabitants per year [15, 18].

An overview of two large registers British and American, including patients hospitalized for injuries proves that the percentage of fractures of all clients pelvis ranges from 8 to 9.3%. For the most common cause responsible for Pelvic bone fractures are considered injuries suffered in traffic accidents, especially in motorcycle accidents (43-58%). Pedestrians victims of transport accidents with Pelvic fractures account for 20-22%, while fractures resulting from accidental falls constitute from 5 to 30% [16, 17, 18].

3. Rehabilitation in hip joint injuries

When starting the rehabilitation process for the elderly, care should be taken about both their physical condition and their mental state. Geriatric rehabilitation should be carried out on many levels. This means that it should primarily focus on the rehabilitation of the main problem of an elderly person. The top priority during the first phase of rehabilitation should be the movement specifics of an elderly person [23].

In case of hip joint injuries we need to focus on the type of injury and the course of treatment. The most common type of hip injuries happening for elderly people depending on their age are the following: proximal femur fracture, trochanteric fracture and femoral neck fracture [19].

Depending on the type of fracture, appropriate procedures are taken. In case of the above fractures the main choice is surgical treatment, therefore it is important to start the rehabilitation process as soon as possible to allow for a quick recovery of the joint [20].

In this case, anticoagulant therapy is introduced within the first 24 hours after the surgery; following days introduce verticalization and learning to walk. It is important to strengthen the muscles, i.e. the

large, small and medium gluteus muscle, the quadriceps, the ischio-shin group: the biceps, the semitendinosus and semimembranosus muscle. Initially this can be achieved with isometric exercises, assisted exercises and active exercises. In later stages, we can introduce partial and full weighing of the limb. Proprioceptive and coordination exercises should also be introduced as part of the ant-tummy prophylaxis. An important element of the post-operative stage is educating the patient abut post-hospital life. Patients should be informed about the principles of safe behaviour at home. It is important to inform the patient about his limitations and the gradual introduction of physical activity.

Physiotherapy is also introduced for faster tissue regeneration and pain relief, i.e. hydrotherapy, balneotherapy, magnetotherapy, thermotherapy and laser therapy which have analgesic, anti-swelling and anti-inflammatory effects. Hydrotherapeutic treatments are responsible for reducing the muscle tension around the hip. They also reduce pain in the area of the hip joint.

Cold treatment is recommended for people after hip joint injuries in cases of edema, inflammation in the joint and severe pain where desired effects are analgesic, anti-inflammatory, anti-haemorraghic and preventing or reducing the formation of post-traumatic hematomas. Another valuable effect of cryotherapy is the reduction of post-traumatic and inflammatory edema [24].

Magnetotherapy accelerates the healing process of wounds and fractures. It improves blood circulation around the joint, relieves pain in the hip joint area, has a soothing and anti-inflammatory effect [24].

Laser light treatment is also implemented in the rehabilitation process; it improves the blood supply and nourishment of tissues around the hip joint, relaxes muscles and reduces pain [24, 25].

It is very important to personalise the rehabilitation procedure. Water environment is very good for older people since it affects both the body and mental state of the patient. Different exercises are used to get the patient in various positions, usually supination, but also multi-plane positions and side positions. It is beneficial to perform crosswise, longitudinal and combined rotation exercises [22].

Spa treatment is recommended during rehabilitation of hip joint injuries as it gives the opportunity to relax, meet new people, relief from side effects and a break from everyday life [21].

4. Assessment of the effectiveness of individual rehabilitation procedures

Hip dislocation is relatively common musculoskeletal disorder in elderly. Different methods of rehabilitation and exercise have different effectiveness in returning the geriatric patient to full mobility or improving his locomotor functions. It can be concluded that exercise therapy is effective in this group of patients [26]. Available evidence indicates beneficial effects on all studied outcome parameters:pain, self-reported disability, observed disability in walking, and patient's

global assessment of effect. Since pain and disability are the main symptoms in patients with OA, exercise therapy seems indicated. However, the size of the effects is modest and needs to be enlarged [26].

Berger and co-authors carried researches to assess the potential recovery rate of a minimally invasive total hip replacement technique with minimal soft tissue disruption [27]. One hundred consecutive patients were enrolled in this prospective study. Ninety-seven patients (97%) met all the inpatient physical therapy goals required for discharge to home on the day of surgery; 100% of patients achieved these goals within 23 hours of surgery. Outpatient therapy was initiated in 9% of patients immediately, 62% of patients by 1 week, and all patients by 2 weeks. The mean time to return to work was 8 days, discontinued use of any assistive device was 9 days, and resumption of all activities of daily living was 10 days. The mean time to walk ½ mile was 16 days. Furthermore, there were no readmissions, no dislocations, and no reoperations. Therefore, a rapid rehabilitation protocol is safe and fulfills the potential benefits of a rapid recovery with minimally invasive total hip arthroplasty [27].

Moreovertheless, it is important to remember that the geriatric patient is specific, due to his multimorbidity, polipharmacotherapy and other limitations (frailty, deafness, amblyopia, sarcopenia and others). So a multidisciplinary team of specialists should be involved in the process of rehabilitation of geriatrics patients. It is necessary to achieve as a result significant functional improvement of the patient [28].

Discussion

The dislocation in the hip joint, most often caused by injuries, is a relatively well-studied condition. The first description of this displacement appeared already in 1870, and was made by Bigelow [29]. His work was considered essential for the whole world of science, and after 8 years the scientist's observations in the Lancet magazine [30] were reported. Since then, the issue of this condition has been regularly developed. One should not forget, however, about the rapid development of medicine, including the methods of physiotherapeutic rehabilitation, which is connected with the need to conduct further research on the state of dislocation within the hip joint, in order to develop new methods of treatment that can be realized in modern healthcare.

In developing the knowledge on the subject should also take into account the changing conditions of everyday life, and thus changes in the causes of injuries to the hip. According to a study conducted at the National Orthopedic Hospital Enugu in Nigeria, where 48 cases of dislocation within the hip joint were described, up to 91.6% of the respondents suffered an injury as a result of traffic accidents. It is also noteworthy that the vast majority of the victims were men (81.3%) [31]. Similar results were

recorded at King Fahd University Hospital in AlKhobar (Saudi Arabia). In the years 1993-2004, there were 97 patients hospitalized with a recognized dislocation within the hip joint. Data from 58 of them were subjected to statistical analysis, which showed that the vast majority of the respondents were injured as a result of transport accidents (43), and that the vast majority of patients were men (52) [32]. The results of both studies are consistent that the dislocation in the hip joint mainly affects men, and the cause is injuries caused by traffic accidents. However, it should be noted that research has been conducted in countries where everyday life differs from that found in Western countries. According to data from Davos Hospital (Switzerland), located in an area where winter sports are an important element of everyday life, 69% of patients with the condition were injured because of sports. Research confirms the thesis that injuries are more likely to affect men [33]. Differences in research, probably resulting from differences in the everyday lives of residents of different countries, should therefore be taken into account in determining the risk factors of dislocations within the hip joint.

Conclusions

Hip joint injuries often have complex and multifactorial causes. They can be dangerous at any age. The effects of a hip joint injury can be felt for many years. Therefore it is so important to apply a properly adjusted physical therapy to each patient. Incorrect handling of such an injury in the elderly can result in serious consequences. Loss of independence can lead to depression in the elderly. Therefore, individual approach to the patient is important in physiotherapy. The hip joint through its location and construction is exposed to injuries and due to its loading rapidly degenerates. Rehabilitation in the case of hip joint injuries or the occurrence of degenerative changes should be taken as soon as possible.

Periods of immobility and staying still increase the risk of muscle atrophy, which causes the muscular strength of patients to decrease. The task of physiotherapists is to stimulate the muscle pump and to improve the work of the cardiovascular system through exercises included in the kinesiotherapy and to conduct physical therapy treatments that have analgesic and anti-inflammatory effects.

Along with the progress of medicine, the department of physiotherapy also develops. There are many methods that physiotherapists use when working with a patient. The efficacy of therapy for patients with hip injuries depends on: selecting appropriate techniques for the patient's functional status, commitment to the work of the patient, and from the time devoted. In the event that the injury is serious, the time of physiotherapy is prolonged. However, freeing yourself from pain and returning to independence is worth your time.

References

1. Gaździk T. Orthopedics and traumatology, Vol. 1, p. 278
2. Manini T, Pahor M: Physical activity and maintaining physical function in older adults. Br. J. Sports Med. 2009;43:28-3
3. Zhou Y, Zhang C, Zhao S, Wang Q. Closed reduction of the traumatic posterior-dislocation of hip joint using a novel sitting technique: A case series. Medicine (Baltimore). 2018; 97(41):e12538
4. Voight ML, Robinson K, Gill L, Griffin K. Postoperative rehabilitation guidelines for hip arthroscopy in an active population. Sports Health. 2010; 2(3):222-30
5. Kostka T. Health needs of older people – the possibilities and legitimacy of preventive intervention. National Scientific Conference. Aging societies: New areas of medical care – system needs and solutions. Katowice, 2-3 March 2006
6. Kiwerski, J., Rehabilitacja medyczna PZWL Warszawa 2005, 560-579
7. Brotzman S., Wilk K., „Rehabilitacja ortopedyczna" Tom 2, Redakcja wydania polskiego Artur Dziak, Elsevier Urban & Partner 2012 659-685
8. Marchewka A., Dąbrowski Z., Żołądź J., „Fizjologia starzenia się – profilaktyka i rehabilitacja" Wydawnictwo Naukowe PWN Warszawa 2012
9. Glazer G., Niedziałek P., Gągała J., „Wyniki leczenia złamań okołokrętarzowych kości udowej przy pomocy śrubopłytki ześlizgowej DHS u pacjentów hospitalizowanych w latach 2005-2012 w Klinice Ortopedii i Traumatologii Uniwersytetu Medycznego w Lublinie" Chirurgia Narządów Ruchu Ortopedia Polska, 2016; 81(4) 121-125
10. Niemczewska-Wójcik M., Piekoszewski W., „Analiza procesów tribologicznych występujących w skojarzeniu panewka–główka endoprotezy stawu biodrowego" Tribologia (6) 2015
11. Drużbicki M., Kwolek A., Pop T., „Trudności w rehabilitacji po złamaniu szyjki kości udowej u pacjentów ze schorzeniami neurologicznymi – opis przypadków" Przegląd Medyczny Uniwersytetu Rzeszowskiego Rzeszów 2006, 4, 292–297
12. Głowacka P., „Fizjoterapia w geriatrii" Wyższa Szkoła Biznesu w Dąbrowie Górniczej 2015
13. Epidemiology of traumatic hip dislocation in patients treated in Ceará, Brazil Luciana Cascão Lima, Robson Alves do Nascimento, Victor Monte Tenório de Almeida Fernando Antônio Mendes Façanha, Filho
14. Laird A., Keating J.F.: Acetabular fractures: a 16-year prospective epidemiological study. J. Bone Joint Surg Br 2005,87,969–73

15. Balogh Z., King K.L., Mackay P. et al.: The epidemiology of pelvic ring fractures: a population-based study. J. Trauma 2007, 63, 1066–73.
16. Giannoudis P.V., Grotz M.R., Tzioupis C. et al.: Prevalence of pelvic fractures, associated injuries, and mortality: the United Kingdom perspective. J. Trauma 2007, 63, 875–83
17. Demetriades D., Karaiskakis M., Toutouzas K. et al.: Pelvic fractures: epidemiology and predictors of associated abdominal injuries and outcomes. J. Am Coll Surg 2002, 195, 1–10
18. Jerzy Kiszka, Krzysztof Gutkowski Złamania miednicy u dorosłych: epidemiologia,klasyfikacja, diagnostyka i leczenie, Przegląd Medyczny Uniwersytetu Rzeszowskiego, Rzeszów 2010, 1, 87–93
19. Analysis Of Fractures In People Aged Over 65 Years Old. Andrzej Miturski Sabina Zybińska Katarzyna Wardach Andrzej Ochal Agnieszka Karska Adam Nogalski, Ostry Dyżur 2011, Tom 4, Numer 2
20. Postępowanie Rehabilitacyjne Po Złamaniach W Obrębie Nasady Bliższej Kości Udowej, Praktyczna Fizjoterapia Rehabilitacja, Dr Katarzyna Ogrodzka, Dr Tomasz Ridan, Z Praktyki Gabinetu, Luty 2013, 58-63
21. Health Resort Medicine – Contemporary Resort Health Care In Poland, Jarosław Drobnik, Martyna Malcewicz, Piotr Józefowski, Donata Kurpas, Andrzej Steciwko, Family Medicine & Primary Care Review 2011, 13, 1: 103–108
22. Specifics Of Movement Rehabilitation In The Elderly, Julia Jajor, Sebastian Nonn–Wasztan, Elżbieta Rostkowska, Włodzimierz Samborski, Nowiny Lekarskie 2013, 82, 1, 89–96
23. Kostka T. Potrzeby Zdrowotne Osób Starszych – Możliwość I Zasadność Interwencji Zapobiegawczej. Ogólnopolska Konferencja Naukowa. Starzejące Się Społeczeństwa: Nowe Dziedziny Opieki Medycznej – Potrzeby I Rozwiązania Systemowe. Katowice, 2-3 Marca 2006.
24. Straburzyński G., Straburzyńska-Lupa A., Fizjoterapia, T.1. Pzwl, Warszawa 2006.7. Ridan T., 233: 35-42; 281: 22-26; 392: 38-43
25. Ogrodzka K., Kliś A., Postępowanie Rehabilitacyjne Po Endoprotezoplastyce Biodrowego. Praktyczna Fizjoterapia I Rehabilitacja 2013; 43: 6–22.
26. Van Baar, M. E., Assendelft, W. J., Dekker, J., Oostendorp, R. A., & Bijlsma, J. W. (1999). Effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review of randomized clinical trials. Arthritis & Rheumatism: Official Journal of the American College of Rheumatology, 42(7), 1361-1369.
27. Berger, R. A., Jacobs, J. J., Meneghini, R. M., Della Valle, C., Paprosky, W., & Rosenberg, A. G. (2004). Rapid rehabilitation and recovery with minimally invasive total hip arthroplasty. Clinical orthopaedics and related research, 429, 239-247.

28. Białkowska, J., & Mroczkowska, D. (2014). Specyfika rehabilitacji pacjentów geriatrycznych z wielochorobowością–opis przypadku 82-letniego pacjenta Rehabilitation specificity of geriatric patients with multiple chronic conditions–case of 82-years-old male patient.
29. Bigelow, H.J. Luxations of the hip joint. Boston Medical and Surgical Journal, 1870, 5, 65-67.
30. Bigelow, H.J. On the dislocated hip. Lancet, 1878, 1, 860-862.
31. Onyemaechi, N.O., Eyichukwu, G.O. Traumatic hip dislocation at a regional trauma centre in Nigeria. Nigerian Journal of Medicine, 2011, 20(1), 124-130.
32. Al-Bahlool, A.M., Bubshait, D.A., Sadat-Ali, M. Outcome of traumatic hip dislocation. Turkish Journal of Trauma and Emergency Surgery, 2009, 15(5), 463-466.
33. Holzach, P., Weymann, A., Perren, T., Matter, P. Traumatic hip dislocations. Epidemiologic data at Davos Hospital and a multicenter study in Graubünden Canton, Z Unfallchir Versicherungsmed, 1993, 1, 187-193.