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ORIGINAL ARTICLE

Examining the Distribution and Recurrence of Referred Pain in Hip Disorders in Children

SIRAJ NABI[1], TAUQEER NAWAZ KHAN[2], TAUSEEF RAZA[3], AKKAD RAFIQ[4], OSAMA BIN ZIA[5], RAKHSHINDA YOUNUS[6]
[1]*Lecturer Department of Forensic Medicine & Toxicology People's University of Medical and Health Sciences Nawabshah*
[2]*MO Department of Orthopedics Nishtar Hospital Multan*
[3]*Assistant Professor Department of Orthopedics KMU Institute of Medical Sciences Kohat*
[4]*Associate Professor Orthopaedic Surgery Rahbar Medical and dental College Lahore*
[5]*Assistant Professor Liaquat College of Medicine and Dentistry, Darul Sehat Hospital Karachi*
[6]*Assistant Professor Pathology (Microbiology) Jinnah medical and Dental College Karachi*
Correspondence to: Osama Bin Zia, Email: osama.zia@hotmail.com

ABSTRACT

Objective: Aim of current study was to compare the locations and frequency of referred pain in pediatric hip disorders.
Methods: Total 85 patients diagnosed with SCFE, LCPD, or TSH were presented in this study. Data on the location of pain was gathered at the initial examination and compared across all disorders. SPSS 22.0 was used to analyze data.
Results: There were total 48 (56.5%) males and 37 (43.5%) females among all cases. Mean age of the presented cases was 10.4±8.63 years. 27 cases had SCFE, 25 cases had LCPD and 33 cases had TSH. Among 27 cases of SCFE, 13 cases had hip pain, 7 cases had knee pain 7 cases had thigh pain, in 25 cases of LCPD, 10 cases had hip pain, 6 cases had knee and 9 cases had thigh pain. Among 33 cases of TSH, 12 cases had hip pain, 9 cases had knee and thigh pain was observed in 14 cases.
Conclusion: Patients with SCFE, LCPD, and TSH (a pediatric hip condition) had their pain areas compared. Some kids, following adult reports, experienced referred pain in the knees or thighs as a result of hip joint illness.
Keywords: Hip disorders, Pain, Location.

INTRODUCTION

Hip discomfort can radiate down the leg and into the knee and thigh when the hip joint isn't working properly. People who suffer from hip osteoarthritis often report discomfort that radiates to their lower extremities and groin. Buttocks discomfort (9–21% of patients), knee pain (2–35%), and thigh pain (10–57%) are additional symptoms reported by individuals with hip osteoarthritis[1-3]. Although referred pain to the thigh or knee from a dysfunctional hip joint is well-known, there is a lack of research comparing the locations and frequency of pain in various juvenile hip diseases.

The most severely compromised function is Level V of the five-tiered gross motor function classification system (GMFCS)[4]. There has been conflicting evidence from studies examining the link between motor ability and pain. Research has produced conflicting findings; some studies have failed to find an association[5,6], while others have discovered that discomfort is more prevalent among teenagers with impaired gross motor skills[7]. According to a new registry study that included 2,777 children with CP from Sweden, the GMFCS identified different pain locations. The most often reported symptom during GMFCS I was foot pain, while GMFCS III it was knee discomfort, and during GMFCS V it was hip and stomach pain[10]. Consistent with gender disparities in the overall population, multiple studies have shown that girls with CP experience pain at a higher rate than boys[8]. Not only that, but there is a direct correlation between age and pain severity in this population.[9] Some of the several variables linked to discomfort in CP patients include stiffness and limited mobility[10].

Children with CP often have hip pain, according to a recent study[10]. The precise reasons of hip discomfort are still a mystery, despite the fact that there are recognized risk factors. It is common for children to experience hip pain if their hips are badly dislocated or misplaced. There is an association between a lower GMFCS level and an increased likelihood of hip displacements and dislocations, and between a higher GMFCS level and greater reports of hip discomfort in children[10]. Hip displacements and dislocations are typically preventable[11]. Children with CP have a continuing trend toward a lower incidence of hip dislocations, with the rate falling from 8% to 0.4% since hip surveillance was implemented in Sweden in 1994. The hips are still the second most prevalent location of discomfort for children with cerebral palsy in Sweden, even though there has been progress in reducing hip dislocations. Regardless of their GMFCS level, these children make for 9% of the CP population and 19% of the children with the poorest gross motor function[10].

Childhood conditions such as slipping capital femoral epiphysis (SCFE), Legg-Calvé-Perthes disease (LCPD), and transient synovitis of the hip (TSH) can be challenging to diagnose and treat because they all have different symptoms. Variability in pain manifestation is one of these obstacles that makes quick diagnosis and successful treatments challenging. According to Millis's research, 35% of SCFE patients experience knee pain and 26% experience thigh pain[4]. Matava et al. and Kocher et al. found that patients without obvious hip pain at presentation can be challenging to diagnose with hip discomfort[12]. Clinical decision-making and understanding the pathophysiologies of SCFE, LCPD, and TSH should be aided by knowing the distinct patterns of pain localization in these conditions. This knowledge may pave the way for early diagnosis of these diseases, which might lead to better results and reduced morbidity for impacted youngsters. This research aimed to fill that void by evaluating the clinical features of hip problems in children, measuring the prevalence and distribution of pain, and offering recommendations for future treatment and diagnosis.

MATERIALS AND METHODS

Total 85 children were presented in this study. The study was conducted in People's University of Medical and Health Sciences Nawabshah during March 2022 to January 2023. Included in the study were patients who were diagnosed with SCFE, LCPD, or TSH. Cases where the first examination description of the pain location was ambiguous in the medical record were not included. Uncertainty in determining the location of the pain also led to the exclusion of patients younger than three years old.

Looking through the participants' medical records, we determined the site of the most intense pain during their initial visit and categorized it as either the hip (including the groin, but not specifically distinguishing buttock or lateral trochanteric pain), the thigh, the knee, or some other locale. For each condition, we also looked at the gender breakdown, average age, and distribution of pain sites.

For the purpose of statistical analysis, we checked for variations in the distribution proportions of each survey item using the $\chi 2$ test. We used the Yates correction when it was needed. To compare the groups' average ages at first visit, the Kruskal-Wallis

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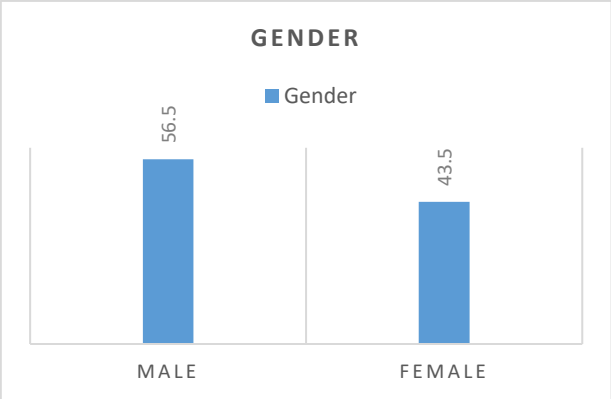
test was utilized. At p<0.05, the level of statistical significance was established.

RESULTS

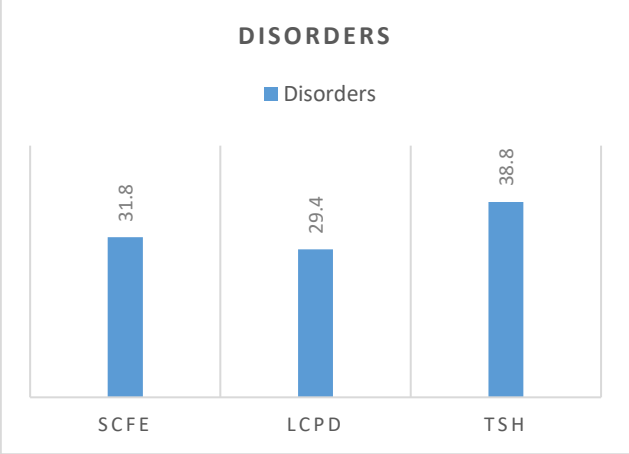
There were total 48 (56.5%) males and 37 (43.5%) females among all cases. Mean age of the presented cases was 10.4±8.63 years.(fig 1)

Figure-1: Gender distribution of the presented cases



Among all, 27 (31.8%) cases had SCFE, 25 (29.4%) cases had LCPD and 33 (38.8%) cases had TSH. (fig 2)

Figure-2: Distribution of disorders



Among 27 cases of SCFE, 13 cases had hip pain, 7 cases had knee pain 7 cases had thigh pain, in 25 cases of LCPD, 10 cases had hip pain, 6 cases had knee and 9 cases had thigh pain. Among 33 cases of TSH, 12 cases had hip pain, 9 cases had knee and thigh pain was observed in 14 cases. (Table 1)

Table-1: Location and frequency of pain among all cases

Variables	SCFE	LCPD	TSH	Total
Hip pain	13	10	12	35
Knee pain	7	6	9	22
Thigh pain	7	9	14	30

DISCUSSION

The knees (15-25%), hips (20-40%), and thighs (20-40%) were the most common areas of pain. Three common pediatric hip diseases—SCFE, LCPD, and TSH—had their referred pain sites compared and studied. There was no discernible variation in the location of the pain, regardless of the underlying cause. The researchers adopted the phrase "referral hip joint pain" to characterize the later removal of hip joint discomfort when the underlying hip issue resolved. Hip joint pain that travels down the leg or into the buttocks is known as a referral. Theoretically, nociceptive dorsal horn neurons that receive convergent input from many tissues are the source of referred pain in the thigh and knee, arm pain in angina pectoris, and shoulder pain in cholecystitis[13]. That is why higher centers are unable to discern the source of the input. The external femoral and obturator nerves, as well as the internal sciatic nerve, supply the majority of the hip's innervation[14]. Referred pain between the hips and knees may be due, in part, to the fact that 1.6% of dorsal root ganglion neurons also express pain signals to the knees. The authors Miura et al.[15] demonstrated, with the use of double fluorescent tagging techniques, that the dorsal root ganglion fibers are partially distributed between the knee and hip as well.

Several investigations have shown that the capsule surrounding the hip joint includes nerve terminals. Tomlinson et al.[16] postulated that, relative to other regions, the superior-lateral area may possess greater nociceptive and proprioceptive skills. Hip joint discomfort may primarily originate in the anterior capsule, which is supplied by the femoral and obturator nerves and the superior labrum. This capsule has a dense population of nociceptors and mechanoreceptors (Laumonerie et al., 2011). The sciatic nerve mostly innerves the posterior part of the hip capsule, in contrast to the femoral and obturator nerves, which primarily innerve the front part of the hip capsule[17].

We looked at three different pediatric hip disorders, and each one had its own unique cause. Common belief holds that SCFE shares a pathophysiology with proximal femoral epiphysis fractures. Symptoms of femoroacetabular impingement include morphological abnormalities in the femoral head and injuries to the anterior superior labral region[18]. Pathophysiological factors in LCPD are primarily believed to originate from synovitis and femoral head crushing[19]. There is more proof that TSH, as opposed to LCPD, promotes more severe hip joint inflammation and effusion[20]. The cause, site of injury, and length of inflammatory exposure are likely to vary among diseases. The results of this study contradict the concept that referred pain is condition-specific, since it does not take into consideration differences in hip joint capsule innervation and damage sites. Referred pain in adults suffering from hip osteoarthritis has been studied and found to occur often and at specific sites. Lesher et al.[21] discovered that among patients with hip pathology who were due to get intra-articular hip injections guided by fluoroscopy, the most prevalent complaint was referred pain to the buttocks (71%), thighs (57%), groins (55%), or lower legs (16%).

In a retrospective analysis of 113 patients who had total hip arthroplasty, 38% reported pain in the thighs, 36.3% in the buttocks, and 35.4% in the knees[1]. The study's most important finding was that referred pain distributions and rates differed significantly across adult and child populations when none of the three hip disorders were present. Inflammation of the hip sends chemical impulses to nerve terminals in the joint capsule, which these studies suggest may produce comparable rates of pain in the knee, thigh, and hip independent of hip condition. It makes no difference which area of the hip is injured. In order to better understand the causes and potential therapies for hip joint discomfort, future studies should include a larger sample size and a wider variety of disorders.

Treatment outcomes can be impacted by delays in identifying specific hip disorders in pediatric patients. Additional SCFE setbacks and worsening of disease can result from delayed diagnoses[5,6]. It is crucial to identify and treat LCPD promptly in order to prevent femoral head bone abnormalities[19]. Furthermore, to avoid complications, it is recommended to treat septic hip arthritis (often confused with TSH) no later than five days after it starts[20,21]. Even though a prompt and accurate diagnosis is crucial for young people with hip arthritis, it is frequently postponed due to pain being felt in locations other than the hip joint. As indicated in the introduction, this is especially true in SCFE, and patients presenting with pain elsewhere than in the hip joint require much longer to get a diagnosis[22]. The study's important findings will help

in making an early and correct diagnosis because it demonstrated that a specific percentage of children experienced referred pain in the thigh or knee irrespective of the type of hip joint condition.

CONCLUSION

Patients with SCFE, LCPD, and TSH (a pediatric hip condition) had their pain areas compared. Some kids, following adult reports, experienced referred pain in the knees or thighs as a result of hip joint illness.

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