ORIGINAL ARTICLE

Evaluation in adolescents practitioners and non-practitioners of futsal to detect positivity for patellar chondromalacia

Avaliação em adolescentes praticantes e não praticantes de futsal para detectar positividade para condromalácia patelar

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ABSTRACT

BACKGROUND AND OBJECTIVES: An increasingly popular modality is futsal; with increased popularity, the number of adolescents practicing such sport is also increasing and, as consequence, related injuries are also increasing, becoming object of interest of healthcare professionals. This study aimed at comparing signs and symptoms in adolescents practicing and not practicing futsal, to suggest positivity for patellar chondromalacia.
METHODS: To detect patellar chondromalacia, history and physical evaluation (Perkin, lateral patellar shift, Waldron, patellar apprehension and Clarke's signal) were performed.
RESULTS: Participated in the study 88 individuals, being 44 futsal practitioners and 44 non-practitioners. In the practitioners group, 54.5% have reported knee pain versus 34.1% of non-practitioners. The crossing of clinical signs with pain has shown statistically significant values: Perkin test (p=0.030), Waldron test (p=0.030) for practitioners and Perkin (p=0.002), lateral patellar shift (p=0.020) and Clarke's signal (p=0.014) for non-practitioners.
CONCLUSION: This study has shown more positivity of clinical tests for patellar chondromalacia in non-practitioners of futsal, however practitioners had lower frequency of positivity, except for Clarke's signal. In addition, pain was more frequent in the practitioners group.

Keywords: Evaluation, Knee, Pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Uma das modalidades em ascensão mundial é o futsal; com aumento na popularidade, o número de adolescentes que praticam o esporte tem aumentado e como consequência as lesões de sua prática também têm crescido, tornando-se objeto de interesse de profissionais da área da saúde. O objetivo deste estudo foi comparar sinais e sintomas presentes em adolescentes não praticantes e praticantes de futsal, para sugerir a positividade nos testes para condromalácia patelar.
MÉTODOS: Foram realizados anamnese e exame físico (Perkin, deslocamento lateral da patela, Waldron, apreensão patelar e sinal de Clarke) para detecção de condromalácia patelar.
RESULTADOS: Foram avaliados 88 indivíduos sendo 44 praticantes de futsal e 44 não praticantes. No grupo dos praticantes 54,5% relataram sentir dor no joelho, *versus* 34,1% dos não praticantes. O cruzamento dos testes clínicos com a dor mostrou valores estatisticamente significantes: teste de Perkin (p=0,030) teste de Waldron (p=0,030) nos praticantes e nos não praticantes Perkin (p=0,002), deslocamento lateral da patela (p=0,020) e sinal de Clarke (p=0,014).
CONCLUSÃO: Esse estudo mostrou maior frequência de positividade de testes clínicos para condromalácia patelar em não praticantes de futsal, entretanto, os praticantes apresentaram menor frequência de positividade, exceto no sinal de Clarke. Além disso, a presença de dor apresentou maior frequência para o grupo de praticantes.

Descritores: Avaliação, Dor, Joelho.

INTRODUCTION

The practice of sports embraces a wide range of age groups, being widespread in the adolescence phase. However, this activity may lead to future diseases, as for example, chondromalacia patella. It can be defined as the deterioration of the articular cartilage of the posterior part of the patella. In addition, its progression can lead to the formation of fissures, ulcerations, arthritis and osteoarthritis[1]. This dysfunction occurs mainly because of the bad alignment of the patella, due to the load asymmetry on the vastus medialis and vastus lateralis[2].
Knee performance depends on the balance between ligaments and muscles, and instability in these structures causes a lateral displacement of the patella, a common alteration in athletes reporting patellofemoral pain[3]. Physical and functional assessment of patients with chondromalacia consists of subjective information about the pain, functional impairment, as well as special tests that can be performed. Considering the preceding, clinical tests such as Waldron, Clarke's sign, Perkin's, patellar apprehension, lateral patellar displacement and knee angle measurement for the diagnosis of chondromalacia patella have been described in the literature[4].
Chondromalacia patella is related to sports practice and accounts for approximately 10% of care in a rehab clinic. Trau-

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ma, in general, and the excess of physical activity, as joint overload or excessive runs are frequent etiologic agents related to chondromalacia patella in sportspeople in the most varied sports modality, involving mainly women and young people[1]. According to Fronza e Teixeira[5], adolescents require a careful prescribing of physical activities, since the individual is in the final period of development before adulthood. In this context, the objective of this study was to compare signs and symptoms present in adolescents and players of school futsal to suggest the positivity of chondromalacia patella tests.

METHODS

The study was carried out through a cross section into two groups, G1 (individuals who did not play futsal) and G2 (futsal players), who underwent a physical and functional assessment protocol for the suggestive detection of chondromalacia patella, with special and physical tests.

The study was conducted at the Municipal School Professora Josélia Florêncio da Silva (20) and at the Municipal School Álvaro Lins (68). The survey was carried from August to September 2014. In selecting the sample, 88 male volunteers were recruited, with ages between 10 and 15 years, futsal players or not, in each school partnering with the study, selected by convenience. Teenagers who practiced other sports modality were excluded, as well as those with physical and/or mental disability; low frequency (greater than 20% of absences in training); prior knee dysfunction.

All those responsible for the students and volunteers were informed about the purpose of the study and asked to sign two copies of the Free and Informed Consent Term (FICT).

In data collection, it was used a questionnaire containing data such as identification, body mass index (BMI), characteristics of lower limbs (LLLL) using special tests (Figure 1) to detect specific knee diseases, and the visual analog scale (VAS) for quantitative assessment of pain.

Each component was analyzed as follows:

- BMI: calculated by dividing the weight by the square of the height^2, expressed in kg/m^2. For this analysis, we used a Candy® scale and an RIEC® measuring tape. The reference parameters established by the World Health Organization (WHO) were considered[6].
- VAS: validated by Carlsson in 1983. This is an instrument to assess pain intensity[7]. In this analysis, the adolescent was told to rank his pain, ranging from zero to 10, where zero represents absence of pain and 10 unbearable pain
- Waldron's test: the student performed slow push-ups with a full range motion of the knee, while researchers palpated the patella. The test was positive regarding pain and crackle reported during movement.
- Perkin test: the examined knee remained in full extension, and the lateral and medial edges of patella were palpated to generate a medial and lateral movement; the test was positive based on the pain reported.
- Q Angle: the angle between the anterior superior iliac spine line and the center of the patella and another line extending

Figure 1. Special tests for knee assessment

from the center of the patella to the center of the tibial tuberosity[8]. A goniometer was used to obtain this measurement.

• Test of the lateral displacement: the maneuver consisted of the isometric contraction of the quadriceps while the researchers assessed the patella displacement. It was considered positive when the lateral displacement was superior to the cranial[9].

• Clarke's sign: the subject was positioned in the supine position with the limb extended, the examiner pressed the superior pole of the patella and requested an isometric contraction of the quadriceps of the subject while exerting pressure. The test was positive based on pain report by the participant.

This study was approved by the Research Ethics Committee of ASCES College, according to the opinion number 765,477 (2014).

Statistical analysis

Data were processed and analyzed descriptively by the software Epi-Info 6.04 (Center for Disease Control and Prevention, Atlanta, United States). Continuous variables were presented as averages and percentages and were categorized to enable the bivariate analysis, considering statistically significant if p≤ 0.05.

RESULTS

G1 was composed of 44 individuals, with an average age of 12.7 years, 1.55 cm, 47.73 kg (body mass), 20,21 kg/m^2 (BMI) and 2.61 VAS. G2 was composed of 44 individuals, with an average age of 13 years, 1.62 cm, 53.23 kg (body mass), 20.13 kg/m^2 (BMI) and 1.70 VAS.

Table 1 shows that in G2, 34.1% reported knee pain more frequently (20.5%) during the practice of sports, and in higher proportion (13.6%), when running. On the other hand, in G1, 54.5% reported knee pain, with higher frequency (36.4%) after sports practice. In relation to the time of pain onset, of the 24 subjects who reported knee pain, 14 (31.8%) reported it when at rest.

Table 1. Distribution of the variables in relation to pain assessment

Variables	G1		G2		Total (n = 88)	
	n	%	n	%	n	%
Knee pain	24	54.5	15	34.1	39	44.3
Present	20	45.5	29	65.9	49	55.7
Absent						
Moment of pain						
Absence	19	43.2	29	65.9	48	54.5
Before the practice of sports	2	4.5	1	2.3	3	3.4
During the practice of sports	7	15.9	9	20.5	16	18.2
After the practice of sports	16	36.4	5	11.4	21	23.9
Pain in what situation						
No pain	19	43.2	29	65.9	48	54.5
Jumping	1	2.3	1	2.3	2	2.3
Walking	1	2.3	2	4.5	3	3.4
Running	7	15.9	6	13.6	13	14.8
Sudden stops	2	4.5	0	0.0	2	2.3
Crouching	0	0.0	0	0.0	0	0.0
Resting	14	31.8	3	6.8	17	19.3
None of the situations	0	0.0	3	6.8	3	3.4

According to table 2, the relation between pain and the variables of the clinical tests of G1, Perkin (p=0.030) Waldron (p=0.030), and G2, Perkin (p=0.002), lateral displacement of the patella (p=0.020) and Clarke's sign (p=0.014), presented statistically significant association. Cross-linking the other tests with the pain variable showed no statistically significant value.

Table 2. Distribution of cross-linking data of clinical tests and pain

Clinical tests	Pain					
	Yes		No			
	n	%	n	%	Total (n = 88)	P value
Perkin Group 2						
Positive	10	62.5%	6	37.6	16	
Negative	5	17.9%	23	82.1	28	0.002*
Lateral patellar displacement Group 2						
Positive	6	66.7%	3	33.3	9	
Negative	9	25.7%	26	74.3	35	0.020*
Clarke's sign Group 2						
Positive	15	42.9%	20	57.1	35	
Negative	0	0.0	9	100	9	0.014*
Perkin Group 1						
Positive	5	100%	0	0.0	5	
Negative	19	48.7%	20	51.3	39	0.030*
Waldron Group 1						
Positive	5	100%	0	0.0	5	
Negative	19	48.7%	20	51.3	39	0.030*

G1 = individuals who did not play futsal; G2 = futsal players; * Values that showed statistically significant association (p<0.05).

DISCUSSION

Soccer and Futsal are some of the sports modalities most practiced in the world, and mainly in Brazil. These modalities are characterized by a greater physical contact, sharp movements of acceleration and deceleration, leading to various musculoskeletal injuries[10]. Soccer favors the development of lesions in athletes, and it is estimated that about 50 to 60% of sports injuries are caused by this modality[11]. According to Almeida et al.[10], the most prevalent lesions are on the LLLL, involving mainly the thigh and knee. In the study of Pedrinelli et al.[12], carried out during a soccer championship with 12 teams (276 players) with a history of 26 games, 26 players had 63 lesions. The most frequent type of lesion was bruise (25 cases), and the worst-affected regions were thighs (17 lesions) and knees (15 lesions). The region with a higher prevalence of pain reported by children is the LLLL, more specifically the knees, followed by ankle and foot, and this is a result of the practice of sports activities[13]. The present study corroborates the data presented, where it was reported a high rate of knee pain both in G2 (54.5%) and G1 (34.1%).

The practice of physical activity by children and adolescents is being encouraged as a way of preventing several diseases associated with lifestyle. With this, this population group has been choosing one single sports modality very early[13]. The incomplete development of the musculoskeletal system and the large amount of cartilaginous tissue influence the high lesion rate due to musculoskeletal system overload in children and adolescents. A study by Purnell et al.[14] that evaluated 73 acrobatic gymnasts with ages between 8 and 26 years showed that the critical period for the occurrence of injuries is between 11 and 15 years among those evaluated athletes. Although the evaluated modality does not match the modality evaluated in the present study, the age group mentioned as the critical period for the occurrence of lesions is the same as in this study.

Carrying clinical tests as a way of diagnosis contributes to identifying changes in the musculoskeletal system, being essential for a comprehensive evaluation and correct kinetic-functional diagnosis, without excluding the need for complementary examinations[15]. Tavares, Brazil and Nunes[4], after carrying out a study with 52 individuals that had been separated into two groups; G1 with 28 individuals presenting a clinical diagnosis of chondromalacia patella confirmed by image tests, and G2 with 24 individuals with no complaints of knee pain and crackles. The two groups underwent clinical tests for the diagnosis of chondromalacia patella, among them, Clarke's sign. The study suggested caution in the application of clinical tests for the diagnosis of chondromalacia patella, considering that 50% of individuals in G2 presented a false positive result, with apparently healthy knees.

These results are consistent with the ones of the present study, where the group of non-practicing subjects presented an excessive positivity (79.5%) for pain and/or crackles during Clarke's test, even not being exposed to excessive loads for not regularly practice a sports modality. Furthermore, there was a statistically significant association between the pain and Clarke's sign variable in those who do not practice sports ($p \leq 0.014$).

Lillegard, Butcher and Rucker[16] state that several factors can displace the patella from its initial position, leading to an increase in intraosseous pressure and pain. Among these, there are the anatomical factors, including excessive femoral anteversion, external tibial torsion and valgus knee. According to Brandalize and Leite[17], the valgus knee can cause knee pain, since the increase in the tibiofemoral angle leads to the onset of femoropatellar joint painful syndromes and the lateral displacement of the patella causing a bad distribution of weight on the LLLL. In this study, it is observed the high incidence of valgus knees or 55 subjects of the total sample, being 26 of them futsal players and 29 not.

Soccer and futsal players tend to acquire a considerable shortening of the posterior musculature of the thigh due to the muscle strengthening programs with the objective to improve the performance of the kick. This fact leads to the reduction of the sports performance and higher likelihood of muscle lesions[12]. McHugh and Cosgrave[18] emphasized that stretching causes an increase in the amplitude of the joint movement due to the reduction of muscle stiffness or the increase in muscle compliance, helping to reduce pain. This result is not consistent with the results of this study, which showed that of the 26 futsal players who did stretching, 15 reported pain according to the information gathered during the interview. We did not find recent articles (stretching, harm, pain) addressing the secondary effects of stretching in athletes.

CONCLUSION

This study showed a higher frequency of positivity in chondromalacia patella clinical tests in non-futsal players. However, futsal players presented less positivity frequency, except for Clarke's sign. Moreover, pain was more frequent in the group of futsal players.

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