

Arthroscopic Repair of a Bucket-Handle Tear of a Discoid Lateral Meniscus in a 14-Year-Old Child: Case Report

Reparação Artroscópica de uma Rotura em Asa-de-Cesto num Menisco Lateral Discóide numa Criança de 14 Anos: Caso Clínico

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ABSTRACT

A discoid meniscus is a rare congenital anatomic variation with an estimated incidence of 1% to 3% in children. Due to their abnormal shape, discoid meniscus are associated with reduced tissue quality, less vascularization and looser peripheral attachments when compared to normal ones. Individuals with this abnormality are more predisposed to sustain meniscal injuries.

Although meniscal injuries are less prevalent in children, they are associated with a higher healing potential when comparing to adult population. Currently, treatment options are either partial meniscectomy or meniscal repair. However, meniscectomy in children is associated with a faster progression to osteoarthritis than in adults.

It is of great importance to identify and repair these injuries when possible, to achieve favorable long-term outcomes. The authors report the pre-operative evaluation, arthroscopic findings, repair technique, and post-operative outcome of a 14-year-old basketball player who sustained a displaced bucket handle tear of a discoid lateral meniscus. This is a rare injury pattern in pediatric population with sparse reports being found in literature.

The meniscus reduced well and was found to be stable after repair. The patient regained full range of motion and returned to full unimpeded activity at three months post-operatively. At six months she returned to play without limitations.

This report presents a rare meniscal injury in a pediatric patient who underwent surgical repair with successful recovery to date. It highlights a technique for meniscus repair which is of particular benefit when comparing to partial meniscectomy, especially in pediatric population.

Keywords: Adolescent; Arthroscopy; Menisci, Tibial/surgery; Tibial Meniscus Injuries/surgery; Treatment Outcome

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RESUMO

O menisco discóide corresponde a uma variação anatômica rara, com uma incidência estimada de 1% a 3% na população infantil. Esta variante caracteriza-se por ter uma menor qualidade tecidual o que, conseqüentemente, aumenta a sua susceptibilidade de ruptura.

Apesar de as lesões meniscais serem menos frequentes na idade pediátrica, estão geralmente associadas a um maior potencial de cicatrização e recuperação. Assim, torna-se de extrema importância diagnosticar e tratar atempadamente estas lesões.

Os autores apresentam um caso clínico de uma adolescente de 14 anos, atleta de basquetebol, que sofreu uma rotura em asa de cesto no menisco medial, que apresentava uma configuração discoide. Este é um padrão de lesão raro na idade pediátrica, com poucas descrições encontradas na literatura.

Procedeu-se a sutura meniscal e, após a cirurgia, o menisco encontrava-se estável e reduzido. A doente obteve uma excelente recuperação funcional, com retoma das suas atividades da vida diária aos 3 meses após cirurgia. O retorno desportivo aconteceu aos 6 meses após tratamento, encontrando-se atualmente a competir sem limitação no joelho afetado.

Este trabalho apresenta uma lesão meniscal rara que foi reparada cirurgicamente, preservando o menisco, com excelentes resultados atingidos.

Palavras-chave: Adolescente; Artroscopia; Lesões do Menisco Tibial/cirurgia; Meniscos Tibiais/cirurgia; Resultado do Tratamento

INTRODUCTION

The discoid lateral meniscus is one of the most common abnormal meniscal variant in children, with an estimated incidence of 1% to 3% in the pediatric population.¹This is a congenital anatomical abnormality of the meniscus shape, in which the meniscus is thicker and larger than normal.²

Discoid menisci present an irregular structural arrangement of collagen fibers, making them more fragile. Moreover, they are also characterized by having less vascularization and looser peripheral attachments when compared to normal meniscus.²

These characteristics predispose discoid menisci to injury and tears causing pain and functional impairment.

Bucket-handle meniscal tears are displaced longitudinal tears in which the torn inner fragment is displaced centrally from the peripheral remnant into the intercondylar notch. This lesion tend to occur more frequently in normal menisci than in discoid menisci.³Arthroscopic treatment aims to stabilize the meniscus to restore knee function and reduce the risk of early osteoarthritis. Currently, treatment options are either partial meniscectomy or meniscus repair to remove or reduce the damaged meniscus, respectively.

According to the available literature, favorable outcomes have been associated with arthroscopic repair of discoid meniscus in children. On the other hand, meniscectomy,

even if partial, has been related with poorer results in the pediatric population, with a faster progression to osteoarthritis being noticed.^{4,5}

In this paper, the authors report the pre-operative evaluation, arthroscopic findings, repair technique, and post-operative outcome of a 14-year-old patient presenting with a bucket handle tear of a discoid lateral meniscus. This is a rare injury pattern in pediatric population with sparse reports being found in literature.

CASE REPORT

A 14-year-old female volleyball player, with no past medical history, presented at our hospital for evaluation of her left knee. She complained of persistent pain in the left knee developed over a year with progressive limitations in her daily activities. Physical examination of her left knee showed lateral joint line tenderness. No limitation in range of motion was noticed and results of ligamentar clinical evaluation were within normal. Plain radiographs demonstrated normal anatomic alignment and did not show any abnormalities. A magnetic resonance of the knee revealed a displaced bucket-handle tear of a lateral discoid meniscus and a parameniscal cyst (Figs. 1 and 2).

Pre-operative functional scores were evaluated. Patient reported-outcomes were: Knee Injury and Osteoarthritis Outcome Score (KOOS) was 77, International Knee

Documentation Committee (IKDC) was 74.7, Tegner Lysholm Knee Score was 78 and Tegner Activity Scale was level 5.



Figures 1 and 2. MRI showing a bucket-handle tear of discoid lateral meniscus and a parameniscal cyst.

Surgical Intervention

Under general anesthesia, a left knee arthroscopy was made using standard anterolateral and anteromedial portals. Arthroscopic findings were in concordance with the magnetic resonance imaging (MRI) results: a bucket-handle tear of a discoid lateral meniscus was found with displacement of the torn portion of the meniscus into the intercondylar notch (Fig. 3). The discoid meniscus can be classified as corresponding to a type II in Watanabe classification. No additional lesions were identified in this patient. Medial meniscus and ligamentous structures were found to be intact.

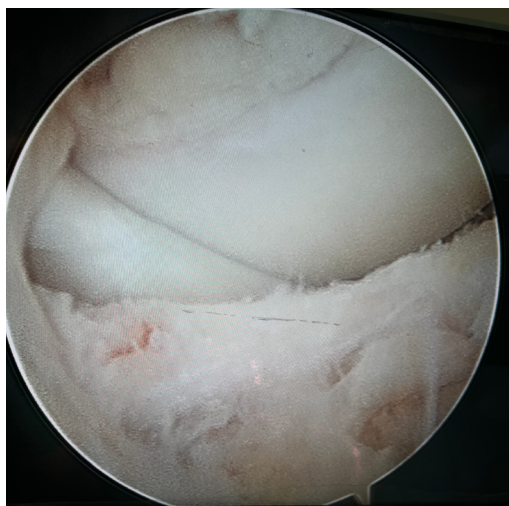
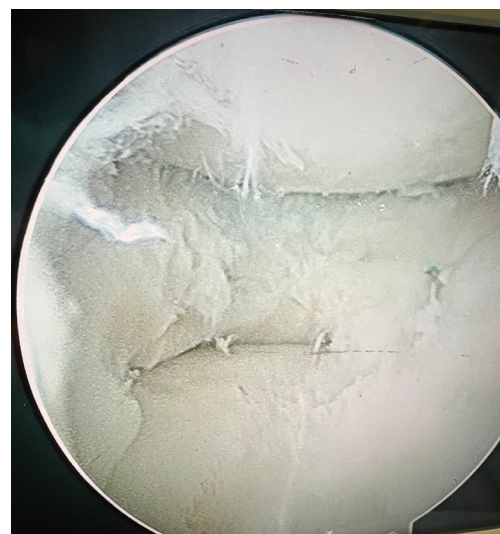
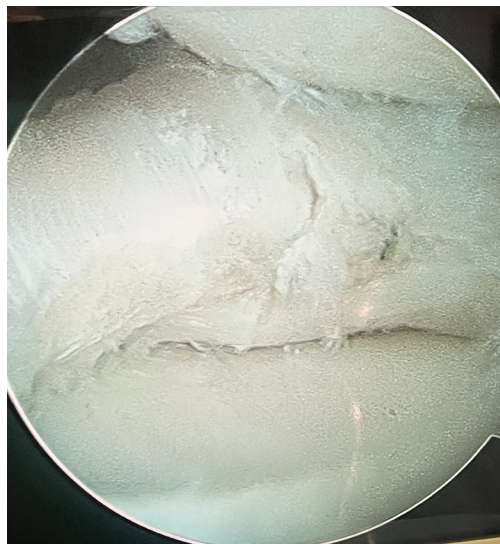


Figure 3. Displaced bucket-handle tear of a lateral discoid meniscus

Once the lateral meniscus was reduced, an outside-in suture was performed in the mid-body of the meniscus to maintain reduction. Three all-inside vertical mattress sutures were passed to stabilize mid-body and posterior horn

of the meniscus. Saucerization was also performed to achieve a better anatomic configuration and adaptation to the articular surface, thus enhancing the healing potential of the meniscus.

After repair, the meniscus was found to be stable in its correct position (Figs. 4 and 5).



Figures 4 and 5. Stable meniscus after repair

Follow-up and Outcomes

Follow-up appointments occurred at two, four, six and twelve weeks postoperative. No weightbearing was allowed in the first month postoperative.

The patient was allowed to increase passive knee range of motion gradually. Isometric quadriceps exercises were taught to the patient since day one. Passive flexion until 90° was allowed at 2 weeks. Progressive weight-bearing was allowed at four-weeks postoperative and she started physical therapy sessions.

At six weeks, the patient reported only mild sporadic pain and her left knee was able to flex to 110°. Full weight-bearing was tolerated at this point.

Three months past surgery, the patient presented without pain or any symptomatology related to her knee and had returned to her normal daily activities without limitations.

At six months post-operatively she presented very satisfied with the outcomes achieved. Full active and passive range of motion was noticed and the patient resumed full activity, including volleyball practice, without complaints.

Post operative scores were evaluated. KOOS score improved to 93, IKDC to 95.4 and Tegner Lysholm Knee Score was 78 and Tegner Activity Scale was level 95.

DISCUSSION

Sparse reports are available of bucket-handle meniscal tears management in pediatric population, especially when of this type of tear occur in a discoid meniscus.

Discoid menisci have higher predisposition to tear than normal menisci due its shape, vascularization and looser organization of its collagen fibers. The incidence of bucket-handle tears is higher in these meniscus.⁵

Due to its rarity, lack of evidence is found regarding bucket-handle meniscal tears treatment and its outcomes in pediatric population, making these cases challenging and demanding.

Although partial meniscectomy might be well tolerated in adults, it must be avoided in pediatric population as it accelerates the incidence of osteoarthritis. It is also associated with higher prevalence of symptoms and limitations that may adversely affect children's basic activity level.^{3,4}

Furthermore, as children have higher healing potential of the meniscus and better vascularization, meniscal repair should be aimed when treating these lesions in order to achieve better prognosis and functional outcomes.⁴ This case report presents a rare injury in the pediatric population and its management, explaining the surgical technique performed to reduce and stabilize the meniscus and also details the post-operative follow-up.

In this case we were able to preserve the meniscus by repairing the tear, avoiding the consequences of meniscectomy in

a fourteen-year-old child. Follow-up revealed excellent outcomes.

Responsabilidades Éticas

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CSS: Contribuiu no planeamento, revisão da literatura, recolha de dados e elaboração do artigo.

DS: Contribuiu para a revisão da literatura sobre o tema e revisão final.

TC: Contribuiu para a revisão da literatura e análise de dados.

JMM: Contribuiu no planeamento, revisão científica do artigo e revisão crítica do trabalho.

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Contributorship Statement

CSS: Contributed to the planning, literature review, data collection and drafting of the article.

DS: Contributed to the literature review on the topic and the final review.

TC: Contributed to the literature review and data analysis.

JMM: Contributed to the planning, scientific review and critical review of the article

NT: Contributed to the planning and drafting of the article and final revision of the article.

All authors approved the final version to be published.

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