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Update Article

Current possibilities for hip arthroplasty☆,☆☆

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ABSTRACT

Hip arthroscopy has been popularized over the last decade and, with technical advances regarding imaging diagnostics, understanding of the physiopathology or surgical techniques, several applications have been described. Both arthroscopy for intra-articular conditions and endoscopy for extra-articular procedures can be used in diagnosing or treating different conditions. This updated article has the objective of presenting the various current possibilities for hip arthroscopy.

Possibilidades atuais da artroscopia do quadril

Palavras-chave:
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RESUMO

A artroscopia de quadril tem sido popularizada na última década e com o avanço técnico, seja no diagnóstico por imagem, no entendimento da fisiopatologia ou na técnica cirúrgica, diversas aplicações foram descritas. Tanto a artroscopia, para afecções intra-articulares, como a endoscopia, para procedimentos extra-articulares, podem ser usadas no diagnóstico ou no tratamento de diferentes afecções. Este artigo de atualização tem como objetivo apresentar diversas possibilidades atuais da artroscopia de quadril.

Introduction

Hip arthroscopy has become popular over the past decade and, with technical advances in imaging diagnostics,[1] in understanding the physiopathology or in surgical techniques, several applications have been described.[2,3] It was first described by Burman in 1931 (in Byrd et al.[4]), who considered that the capacity of this technique for enabling viewing was extremely limited and that this method was potentially iatrogenic. During the 1980s and 1990s, there were developments in traction techniques that facilitated access to the central compartment.[5,6] Since then, better understanding of the arthroscopic anatomy of the peripheral compartment and use of arthroscopy without traction have provided an environment that is favorable toward wide-ranging joint exploration.[7] Once

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the understanding of the arthroscopic anatomy of these compartments had become well established, there was a natural expansion of endoscopic exploration to other compartments around the hip, such as the peritrochanteric, subgluteal and medial spaces of the hip.[8–10]

The arthroscopic anatomy is already well known.[11] Multiple portals are possible and are well defined with regard to their safety,[12] as is the anatomical technique in relation to preservation of the vascularization of the femoral neck.[13,14]

Indications

Lesions of the acetabular labrum

This is one of the commonest indications.[15] The labrum functions as a joint seal, helps in producing and enabling circulation of the synovial fluid and allows continual lubrication of the joint.[16] In addition to its proprioceptive function, it adds stability to the joint because of the vacuum phenomenon, deepens the hip joint, provides greater uniformity of pressure distribution and increases the contact surface between the femoral head and the acetabulum by 22%.[17,18]

Lesions of the acetabular labrum may occur due to direct trauma during sports activities. In fact, these lesions rarely occur in the absence of morphological alterations to bones.[19] Thus, the arthroscopic results from labral debridement alone, without treating the underlying bone dysmorphism, are unsatisfactory.[20] In most cases, femoroacetabular impingement (FAI) makes the acetabular labrum the first structure to fail.[21]

These lesions may compromise the load absorption and stabilization function of the acetabular labrum and may lead to arthrosis, as also found with meniscal lesions.[22] Finite element studies[16,17] have demonstrated that if the sealant function of the labrum is compromised, the mechanical demands on the underlying cartilage are increased, along with shearing forces, which may contribute toward causing injury due to cartilage fatigue and subsequent arthrosis.[23]

In addition to FAI, labral lesions may occur due to repetitive microtrauma, of either high or low-energy nature, especially through hip torsion mechanisms. Repetitive activities, whether in sports or not, which force the hip beyond the habitual range of motion, especially into hyperflexion of the hip, may cause injuries. These mechanisms may include activities such as performing leg press exercises, ballet, yoga, spinning exercise, other gym activities, dancing, working in a squatting position and others.[24–28]

The clinical condition generally consists of anterior pain in the hip, which may irradiate to the groin, trochanteric region or posterior region of the hip. One frequent clinical sign is the "C" sign, in which the patient points out the location of the pain in his hip with his hand in a "C" shape, in transverse orientation over the hip and trochanteric region, which denotes pain of intra-articular origin.[29]

In the treatment, the major objective is to preserve as much of the viable tissue as possible, with selective debridement, reinsertion or labral reconstruction. Studies comparing clinical results from debridement versus labral repair have demonstrated that the best results are obtained through repair.[30,31] Evidence that labral reconstruction, using either autologous or homologous tissue, may present good results in patients with previous labral resection, ossified labra or hypotrophic labra has also started to appear.[32–34]

Femoroacetabular impingement (FAI)

Ganz recognized that FAI could lead to development of labral lesions and early arthrosis in non-dysplastic hips.[35,36] This concept is dynamic, based on movement more than axial loading of the hip. It may result from morphological abnormalities that affect the acetabulum and proximal femur, or it may occur in patients who subject their hips to extreme and supraphysiological ranges of motion. Depending on the underlying cause, FAI may result in lesions of the labrum and acetabular cartilage.[37] After the injury has occurred, synovial fluid starts to circulate through the lesion, in a continuous valvular mechanism. If the low potential for healing in the intra-articular environment is added to this, these hydrodynamic alterations and the bone dysmorphism will perpetuate the acetabular chondral lesion and its delamination of the subchondral bone, until the compensatory mechanisms cease to operate, which leads to arthrosis.

Two distinct types of femoroacetabular impingement have been identified,[35] and they are frequently combined.[38] The first type is characterized by linear impingement of the acetabular rim against the femoral head–neck junction, because of local acetabular supercoverage (e.g. acetabular retroversion) or overall supercoverage (e.g. deep thigh or acetabular protrusion), called a pincer or a pinching effect. The second type occurs with compression of the non-spherical extension of the femoral head into the acetabular cavity, which is called Cam.

Changes to the femoral and acetabular anatomical format may also result from childhood diseases such as Legg–Calvé–Perthes, epiphysiolysis, changes in inclination and acetabular or femoral version.[39]

In relation to the clinical condition, patients complain of anterior and lateral pain in the hip. In the anterior impingement test, which is done with maximum internal rotation and 90° of passive flexion of the hip, diminished internal rotation of the hip and associated pain are observed. Flexion and adduction of the hip lead to conflict between the femoral neck and the acetabular rim. Internal rotation and associated adduction cause shearing forces in the acetabular labrum, similar to those in the menisci of the knees, and stimulate the nerve ends. This causes acute inguinal pain in patients with a torn or degenerated labrum[21] (Fig. 1).

The arthroscopic treatment for femoroacetabular impingement consists of elimination of the bone conflict and correction of the deformities, both on the acetabular side and on the femoral side, along with treatment of lesions of the chondrolabral complex by means of osteoplasty of the proximal femur, osteoplasty of the acetabular supercoverage and refixation, reconstruction or labral debridement and treatment of the chondral lesions.[40,41]

Pyoarthritis

Early surgical intervention is essential for obtaining good results from treating septic arthritis of the hip. Arthroscopy has advantages, such as smaller incisions, shorter recovery