



Diagnosis? Painful knee in a 40 year old. Played rugby in his 20'

Diagnosis Post ACL osteoarthritis

SECONDARY TRAUMATIC OSTEOARTHRITIS OF THE KNEE

History of knee injury is a major risk factor for the development of knee OA irrespective of study design and definition of knee injury. As one of the few modifiable/preventable risk factors, knee injury should be part of the future prevention programme in reducing the risk of knee OA [1].

There was a wide variation in the definition and severity of past knee injuries across studies. For example, most studies reported unspecified injuries, which were likely to include both less severe (e.g., minor “twisting” and “sprain”) and severe knee insults requiring treatment such as torn ligaments or tendons and meniscus injuries. It is very likely that these differences account for the wide variability. Subgroup analysis where the well-defined knee injuries had greater risk than poorly defined injuries. Additionally, specified knee injuries may be more serious than non-specified ones and may therefore be easier to recall.

1. OA WITH PATIENTS WITH ACL [2. Knee_ 2009 Aug;16(4):239-44]

Direct and indirect factors contribute.

- a. Meniscal and chondral injuries
- b. Recurrent instability
- c. Abnormal biomechanics
- d. Knee abuse [Elite athletes all had degenerative changes by 35 years and 42% had undergone total knee replacement.

Incidence:

At 20 years follow-up the reported risk of OA after ACL reconstruction

- * Treated ACL: 14%-26% OA with a normal medial meniscus
- * Treated ACL: 37% with partial meniscectomy
- * Untreated ACL: 60%-100%

Type of arthritis PFA or TFA? [Osteoarthritis Cartilage. 2009 Mar;17(3):284-90]

Usually Tibio-femoral arthritis [TFA]. There is relatively low prevalence of mild PF OA after ACL injury treated non-operatively, and it had limited impact on knee symptoms and patient-relevant knee function.

Are Radiographic findings of OA after ACL is clinically significant? [Br J Sports Med. 2011;45(7):583-8]

At 10-15-year follow-up, 70% of ACL recon knee, OA (K&L \geq grade 2) on X ray was and 24% showed moderate or severe radiographic knee OA (K&L grades 3 and 4).

No significant associations were detected between radiographic knee OA and function.

But subjects with radiographic knee OA showed significantly increased symptoms. More so when OA (K&L grade 4).

2. MENISCUS AND OSTEOARTHRITIS:

Both clinical studies and biomechanical research have confirmed the importance of the meniscus. Loss of the meniscus is associated with instability and rapid and severe articular degeneration.

Meniscectomy is recognized as an important risk factor for the development of knee osteoarthritis (OA).

Patients, who had undergone isolated meniscal resection in 1973, 1978, or between 1983 and 1985 at Lund University Hospital, Sweden, were reviewed clinically and X ray: 15-22 years after the surgical procedure. Total meniscectomy [N=317]

*50% had developed radiographic OA in their operated knee, but just over half of these patients were symptomatic.

In additional 20% of the patients had knee symptoms, but did not have radiographic knee OA.

These results confirm a limited correlation between radiographic features of the disorder and symptoms.

Partial meniscectomy induced less radiographic changes related to knee OA compared with total meniscectomy.

Genetic and environmental risk factors interact in OA development.

A degenerative meniscal lesion is often associated with early-stage knee OA, a disorder also involving the meniscal tissue. The tear may thus represent the first "signal" feature of OA. The challenge for the health professional is to discriminate between symptoms caused by a meniscal tear and those caused by OA. Meniscal resection may not benefit the patient with early-stage knee OA. The intervention merely removes evidence of the disorder, while the OA joint degradation proceeds.

RECENT REPORT [4. Am J Sports Med. 2010; 38(9):1907-16]

1. Total Versus Partial Meniscectomy [Arthroscopy. 2002;18(2):183-189.]

Four of the 5 studies that compare partial to total meniscectomy show a significantly increased risk of developing radiographic knee OA in the total meniscectomy group. There was a negative correlation with the amount of meniscus removed and knee joint function with worsening function seen with larger portions of the meniscus removed. Subjective knee function showed 89% of partial and 94% of total meniscectomy groups had no or minor complaints postoperatively. It has been noted no significant difference in

patient-oriented outcomes in partial, subtotal, or total meniscectomy groups.

Shelbourne and Gray[Arthroscopy. 2004; 20:581-585] reported that as more meniscus is removed, radiographic development of OA increases. They reported that patients who have intact medial and lateral menisci have the highest normal radiographic rating (87%), followed by those with part or all of the lateral meniscus removed (70%), then patients with part or all of the medial meniscus removed (63%), and finally by those with part or all of both menisci removed (60%).

There is a negative correlation between the amount of meniscus removed and outcomes. Biomechanically, the peak local contact pressures increase, and there is a decrease in contact area after meniscectomy. With a partial meniscectomy, peak local contact pressure is increased by 65%, and the contact area is decreased by 10%. In the setting of a total meniscectomy, peak contact pressure is 235% of normal, and the contact area decreases by 75%.

Symptomatic radiographic OA (corresponding to Kellgren/Lawrence grade > or =2) was present in 27% in meniscectomy and 10% in control knees. **Relative risk 2.6.** [[Arthritis Rheum. 2004 Sep;50(9):2811-9]

Surgical removal of a meniscus following knee injury represents a significant risk factor for radiographic tibiofemoral OA, **with a relative risk of 14.0 after 21 years.**[3c Arthritis Rheum. 1998 Apr;41(4):687-93.]

2. Medial Versus Lateral Meniscectomy [Arthroscopy. 2003;19:842-849.]

The development of radiographic OA in lateral meniscectomy patients compared with medial meniscectomy patients showed a significantly higher rate in the lateral meniscectomy group. Shelbourne suggested medial meniscectomy causes higher rate of OA.

A few studies found no difference in the development of OA between lateral and medial meniscectomy. This may be the result of the dynamic loading pattern of the knee, with the center of pressure for the normal knee localized in the medial compartment throughout most of the stance phase and particularly during maximum load transmission. Because of this, the load stress on cartilage after medial meniscectomy may be greater than in lateral cases in some patients.[Am J Sports Med. 2010 Sep;38(9):1907-16.]

3. Tear Characteristics [Bolano Am J Sports Med. 1993;21:432-437; Chatain Arthroscopy. 2003;19:842-849.]

Chatain reported a significantly increased risk of developing radiographic evidence of OA with non-vertical tears as compared with vertical tears after a medial meniscectomy. Bolano found degenerative, horizontal cleavage, and complex tears to have an increased association with radiographic OA. They were significantly more likely to report poor results (44%).

4. Degenerative Versus Traumatic Tears: Englund [Arthritis Rheum. 2004;50:469-475.]

Degenerative tears are significantly more likely to develop radiographic OA than those with an acute tear. More importantly, degenerative tears were found to have a significantly higher association with symptomatic OA than acute tears

Degenerative-type tears of the meniscus are significantly associated with a negative postoperative outcome.

This could be explained by the fact that degenerative tears of the meniscus are often seen in the older patient who may have additional lesions present in the knee. Chondral changes, osteophytes, and other features of knee OA likely contribute to the poor outcomes seen with surgery for degenerative meniscal tears. Degenerative tears may result because of this tissue's decreased ability to withstand load and abnormal force transmission during knee joint movement due to decreased water content. This may lead to a **tear developing spontaneously or in conjunction with minor knee trauma**. Based on the available data, meniscectomy surgery for degenerative-type meniscal tears portends a worse outcome than for surgery on meniscal tears of other types. [The American Journal of Sports Medicine, Vol. 38, No. 9, 2010:1907]

5. Alignment: Burks [Arthroscopy. 1997;13(6):673-679.]

Reported that varus knees have significantly higher-grade radiographic side-to-side difference compared with valgus knees in patients who underwent partial medial meniscectomy. Varus alignment is associated with higher contact pressures in the medial compartment and removal of the meniscus, which absorbs shock, transmits load, and increases the force seen by the articular surface.

6. Chondral damage

Patients with preoperative chondral damage have significantly worse outcomes than those without pre-existing chondral injury.

7. History of Hand OA

Some individuals may be genetically predisposed to develop OA. The relationship between knee OA and hand OA has been used as a marker of this genetic predisposition.

8. Effect of Age

Six of the 8 studies that assessed the effect of age on developing radiographic OA in the postmeniscectomy knee found that as patient age increased so did the risk of developing radiographic OA [>40 years]

9. Effect of BMI [Arthritis Rheum. 2004;50:2811-2819]

Increased BMI makes surgery more challenging; subjects the knee to increased contact forces. All studies that analyzed the relationship between BMI and the development of OA found that as BMI increased the risk for developing OA in the postmeniscectomized knee also increased.

> BMI 30, is significantly associated with increased frequency of developing radiographic OA (P 5 .03) and symptomatic radiographic OA

10. Activity

Preoperative activity level as a risk factor for the development of postoperative OA was evaluated in some studies. Chatain reported that there is significant increase in developing OA in patients who participated in preoperative sports after a medial meniscectomy.

11. Effect of ACL Deficiency

Burks reported that patients with ACL-deficient knees had significantly greater radiographic grade changes

12. Meniscectomy Versus Repair [Arthroscopy. 2004; 20:581-585]

Partial meniscectomy Vs meniscal repair for bucket-handle meniscal tears in ACL-reconstructed knees. They reported no significant difference in the development of radiographic OA between the 2 groups. However it is logical to repair meniscus when appropriate.

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