

Knee Meniscectomy Versus Collagen Meniscal Implantation

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OBJECTIVE

The objective of this literature review is to determine if collagen meniscal implantation should be performed more frequently than meniscectomies for the treatment of meniscal injury in order to prevent early onset osteoarthritis.

INTRO

Menisci of the knee function as weight distributing cushions between cartilage surfaces of the femur and tibia. When menisci are injured, the choice of surgical intervention has an impact on the structure and function of the knee joint. That impact may have long-term implications for the health of the knee joint, specifically the onset or progression of osteoarthritis. Meniscectomy debrides and removes damaged meniscal tissue with the goal of preserving as much healthy native tissue as possible. Collagen meniscal implantation attempts to replace defects from meniscal injury with a collagen scaffold to maintain full function of the meniscus.

METHODS

Twelve articles met inclusion criteria and were chosen for the literature review utilizing the Medline with Full Text (EBSCO) database. The search phrase "Collagen Meniscal Implant" and references from the articles found provided the research content for this literature review.

INTERVENTIONS – CMI

Collagen meniscal implant is a device made of type I bovine collagen that is used to fill defects from meniscal injury. For patients treated with CMI, the majority of patients showed no joint-line space deterioration at their 10-year follow-up.⁸ Rodkey et al showed that there was more percent tissue surface area of the meniscus post CMI and no increase in percent tissue surface area of the meniscus post meniscectomy.¹¹

INTERVENTIONS – MENISCECTOMY

Approximately 2/3 of meniscus tears are treated with partial meniscectomy.⁴ The Roos study reported significantly more symptoms and functional limitations for the meniscectomized group than the non-meniscectomized group.⁵ Papalia's systematic review concluded that the amount of meniscus removed is the most critical predictor for the development of knee osteoarthritis.⁶

DISCUSSION

Research indicates that meniscectomized patients report significantly more symptoms and functional limitations than non-meniscectomized patients. This is more evident when total meniscectomies are performed compared to partial meniscectomies. Osteoarthritis risk factors like age, sex, and BMI must be acknowledged when determining appropriate interventions for meniscal injury.

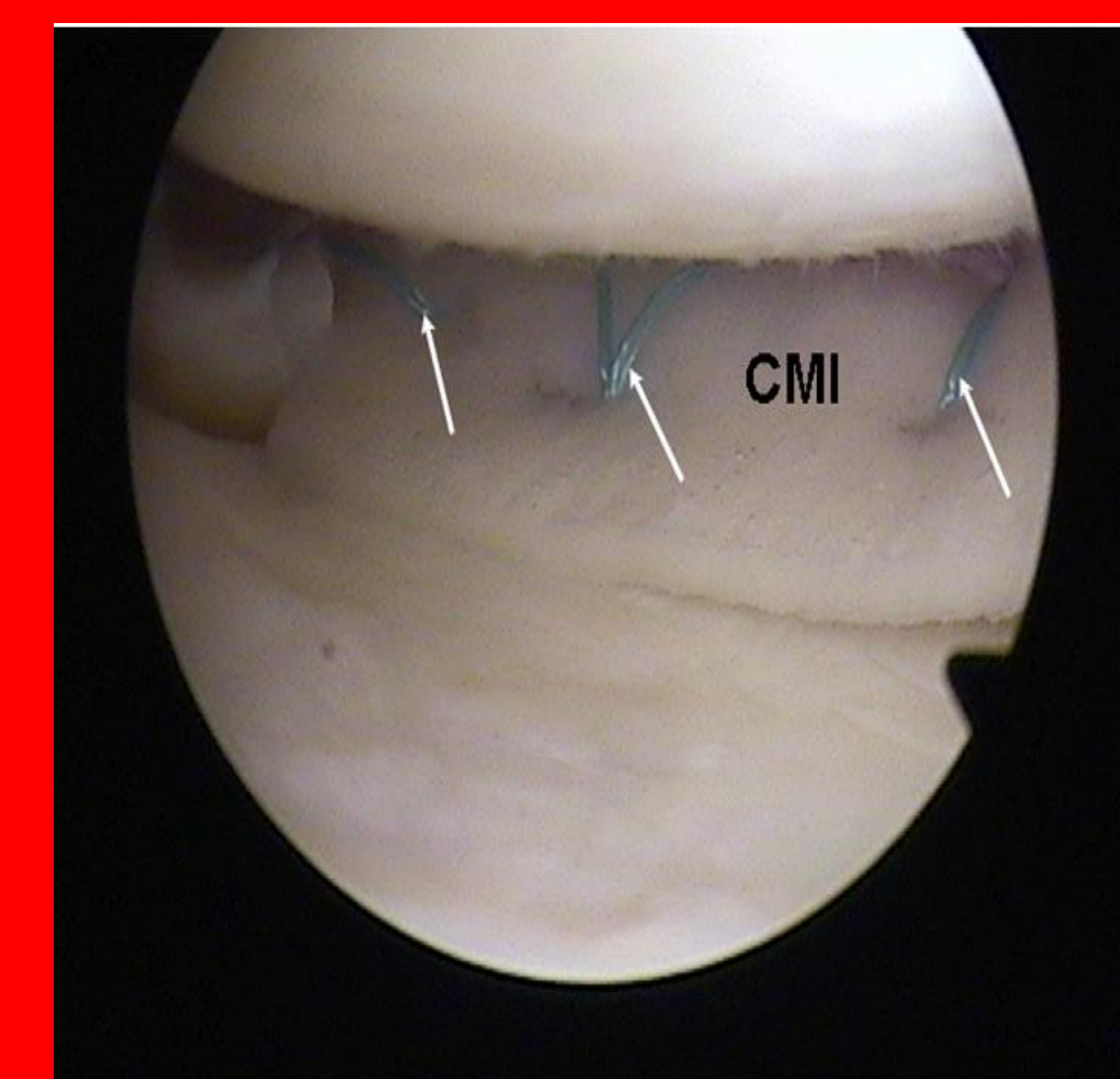
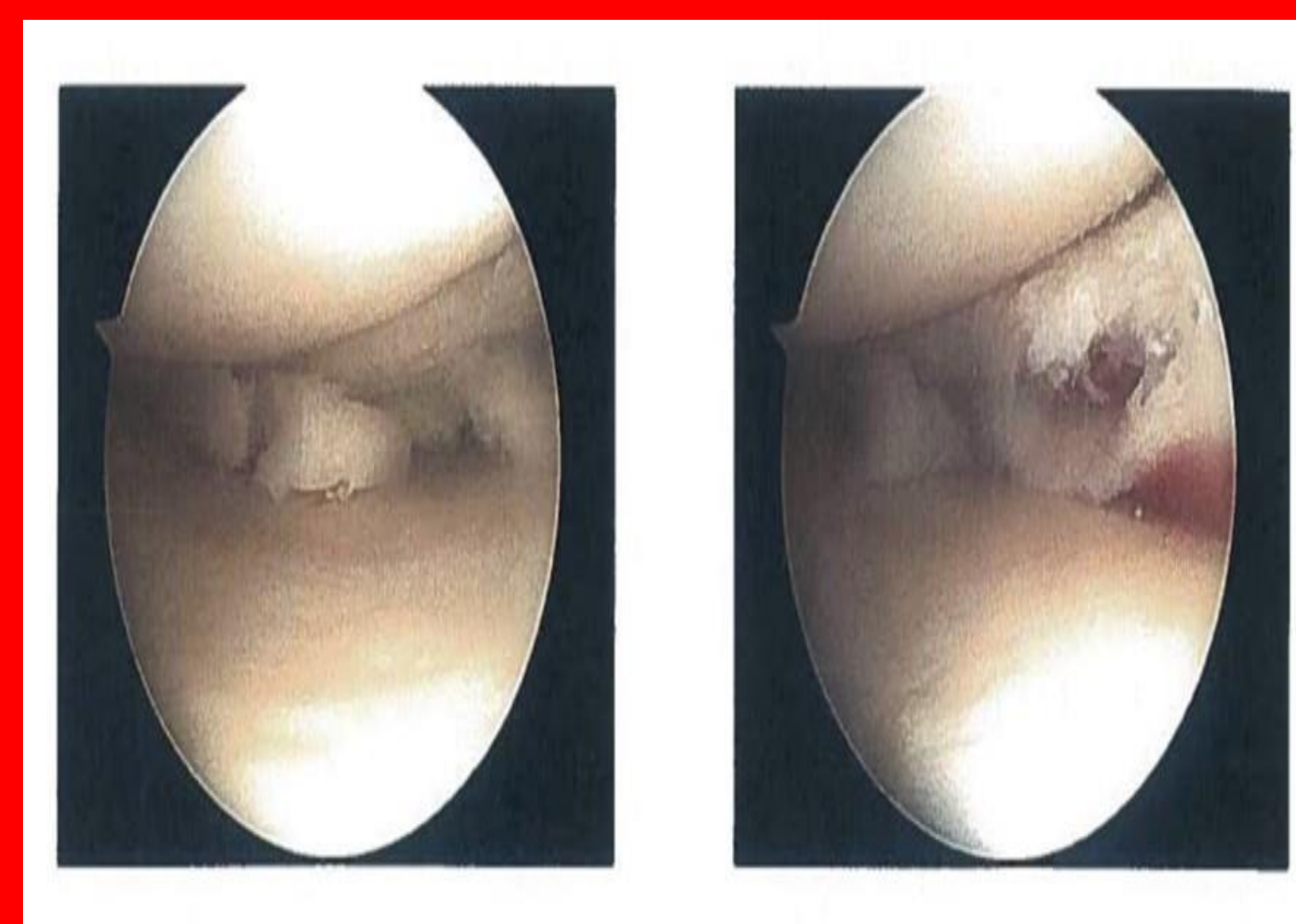
Collagen meniscal implantation is indicated in a more selective patient population. Patients opting for collagen meniscal implantation must retain native anterior and posterior horns of meniscus, sustain non-weightbearing status for six weeks post-operatively, and possess adequate vasculature to the implant.

Each patient's meniscal injury is unique to that patient. The determination of surgical intervention for the management of meniscal injury should be made after a patient has a conversation about the risks and benefits with their healthcare provider.

CONCLUSIONS

The overarching goal of meniscal injury intervention should be to retain as much viable meniscal tissue as possible. More research is needed to determine if collagen meniscal implantation can create significantly better results long-term for the goal of preventing early onset knee osteoarthritis as it relates to maintaining meniscal functionality.

For meniscal injury, collagen meniscal implantation may outperform meniscectomy to delay or prevent the onset of knee osteoarthritis in select patient populations.



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- CMI: Type 1 collagen bovine achilles tendon
- 12 Articles
- 1 systematic review
- 1 prospective randomized trial
- 1 meniscectomy epidemiological study
- 1 study outlining role of meniscus in prevention of osteoarthritis
- 8 long-term follow-up studies
- Treatment methods
 - Partial or complete meniscectomy
 - Collagen Meniscal Implantation
 - NO meniscal transplants
- SF-36 health quality questionnaire
- Medial joint line height
- Lysholm knee scoring
- Tegner activity scale
- International Knee Documentation Committee Score
- 2/3 of meniscal tears requiring surgery are treated with meniscectomy
- Roos 2001 (Partial Vs Total)
 - BMI, age, sex
 - Total meniscectomized group had more symptoms/functional limitations
- Papalia 2011 systematic review of total/partial meniscectomies
 - 32 articles
 - 4,642 patients
 - Mean follow-up 13.3 years
 - Mean 53.5% prevalence of knee osteoarthritis
 - Meniscus retained predictor OA
- CMI Recovery
 - 6 weeks NWB
 - Unrestricted activity at 6 months post-op
- Monllau 2011 (CMI insertion)
 - 22 patients with avg. age of 42.3
 - Lysholm Score: 83% good/excellent results
 - Majority had no joint-line space deterioration
- 10-year follow-up
 - CMI diminished in size
 - Significant pain relief
 - Functional improvement
 - Lack of progression for DJD
- Zaffagnini 2011 (partial vs CMI)
 - 10 year follow-up
 - 6 patients showed preserved cartilage
 - 2 patients with pre-existing Stage 2 arthritis showed no progression
 - Chronic tears with CMI reported less post-op pain
 - Acute tears reported less knee laxity with CMI
- Rodkey 2011 (partial vs CMI)
 - 311 patients (acute and chronic)
 - 2nd look scope grossly meniscus-like tissue
 - Significant difference of tissue surface area

MENISCAL TISSUE SURFACE AREA PRE AND POST PROCEDURE

