2009 Meniscus Transplantation Study Group Annual Meeting

Wednesday, February 25th, 2009 1:00 – 3:30 PM

Wynn Las Vegas, Chambertin Room

3131 Las Vegas Blvd South, Las Vegas, NV 89109

Meeting Agenda:

INTRODUCTION:

Kevin R. Stone, MD, Chairman Update on Meniscus Allograft Transplantation	***1:00 – 1:10*** ***5 min discussion***
Jack Farr, MD, Moderator	***1:16 – 1:26*** ***5 min discussion***

PRESENTATIONS:

MRI of Meniscus Transplants: What to Look For Presented by John V. Crues, III, MD	***1:32 – 1:42*** ***5 min discussion***
Patient Quality of Life as Meniscal Repair or Restoration Treatment Identifiers: A Theoretical Decision-Making Model to Improve Outcomes Presented by John Nyland, MD	***1:48 – 1:58*** ***5 min discussion***
Arthroscopic Anatomic Aperture Fixation of the Meniscal Horns Without Bone Blocks Presented by David N. Caborn, MD	***2:04– 2:09*** ***5 min discussion***
Six-Year Results with Collagen Meniscus Implants (CMI) Based on Location and Meniscus Remaining Presented by William G. Rodkey, DVM	***2:15 – 2:25*** ***5 min discussion***
Outcomes of Combined Fresh Osteochondral Allografting and Meniscal Transplantation Presented by William Bugbee, MD	***2:31 – 2:41*** ***5 min discussion***
Meniscus Allograft Procurement Presented by René Verdonk MD, PhD	***2:47– 2:57*** ***5 min discussion***
All-Inside Arthroscopic Lateral Collagen Meniscus Implant: Preliminary Results (20 months follow-up) Presented by Stefano Zaffagnini, MD	***3:03 – 3:13*** ***5 min discussion***

Patient Quality of Life as Meniscal Repair or Restoration Treatment Identifiers: A Theoretical Decision-Making Model to Improve Outcomes

J. Nyland, D.N.M. Caborn
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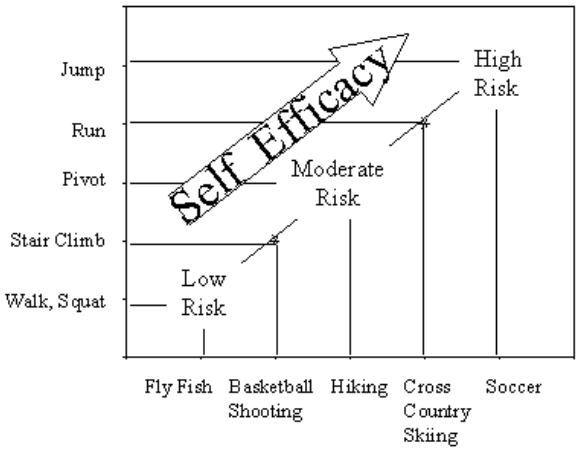
Patient satisfaction after meniscal repair or restoration is largely based on "what they can do" divided by "what they desire to do". Self-efficacy and satisfaction are largely influenced by the denominator (a modified desire or expectation to perform certain activities) as by the numerator (the capacity to perform routine activities of daily living). Since the knee is activated by the largest muscle groups in the body, its function is paramount to overall health. When it is agreed that a given activity should be discontinued, the patient and surgeon must agree on the best surgical option and on the best replacement activities. Early injury recognition can serve as an important teachable moment to educate, reinforce positive behaviors, and correct less desirable ones (smoking, obesity). This process may increase knee joint life and its contribution to overall health. What are the costs of having a pain-free knee if quality of life evoking activities can no longer be performed? From this perspective, patient satisfaction may not be based on what they can do, but on what they are not allowed to do because of their knee and surgical restrictions. To avoid creating a young patient with an old knee, the ideal surgery should maximize both parts of this equation.

Risk: benefit, behavioral change needs, and how selected surgery may positively influence quality of life should be established prior to surgery. Eliminating knee pain should not similarly reduce quality of life and overall health. The goal should be to restore functional, and surgical normalcy.

We propose a method to help decide on the appropriate surgery for a given patient. We believe that this "X-Y" plot model will lead to increased patient self-efficacy, satisfaction, and therefore better outcomes. On the "Y" axis, standard activities of daily living are ranked in order of increasing difficulty. On the "X" axis the top 5-6 activities that the patient enjoys are ranked in order of importance to their quality of life.



The surgeon and rehabilitation clinician then rank these activities based on loading characteristics and fall risk. Patient experience is also factored in, as they should function with greater control performing familiar tasks. The "X" axis is a behavioral contract between the patient, rehabilitation clinician and surgeon. With this model consideration of the capacity for a patient to participate in routine activities of daily living and more athletic, quality of life inducing activities combine to better restore self-efficacy, satisfaction, and overall health across the lifespan, therefore improving outcomes.

Six-Year Results with Collagen Meniscus Implants (CMI) Based on Location and Meniscus Remaining

William G. Rodkey, DVM

Objective: We determined meniscus loss and Collagen Meniscus Implant (CMI) location, then correlated percent meniscus and location with function and activity 6 years later.

Methods: 114 patients with 1-3 prior partial medial meniscectomies age 18-60 years underwent another meniscectomy. Randomly one group received CMI to fill meniscus defects. There were 68 controls and 46 CMIs. At index surgery, amount and location of meniscus removed and CMI placement were documented as posterior (A), middle (B), or anterior (C). 1-year relook was done on CMI patients, and meniscus surface area measured. Patients were followed clinically for 2 years then subjectively. Follow-up averaged 69 months (24-92). Patients provided Lysholm and Tegner scores to assess function and activity.

Results: 29 CMI patients had lesions including posterior and middle thirds (AB); 17 had lesions in all zones (ABC). Lysholm scores were higher with AB (81) than ABC lesions (71), p=0.046. AB patients had higher Tegner index (0.70) than ABC (0.22), thus AB patients regained more lost activity, p=0.049. Comparing all patients with >60% meniscus, CMI patients had higher Tegner index than controls (0.59 vs. 0.30), p=0.036. Comparing 24 month to final follow-up, controls had no change for Lysholm (p=0.13) or Tegner (p=0.39), but CMI patients improved for Lysholm (p=0.02) and Tegner (p=0.04).

Conclusions: Zones of meniscus involvement influenced outcomes at 6 years in CMI patients with ABC lesions doing worse than AB lesions. Patients with successful CMI procedures yielding >60% total meniscus were significantly better than controls for function and activity. CMI patients continue to improve but not controls.

Summary Statement: Meniscus location of CMI implantation influenced clinical outcomes at 6 years, with lesions extending into all zones doing less well than posterior and middle zones only.

Outcomes of Combined Fresh Osteochondral Allografting and Meniscal Transplantation

Gelber J, Görtz S, De Young A, Bugbee W

Introduction

The efficacy of meniscal allograft transplantation (MAT) and osteochondral allografting (OCA) as individual treatment modalities for select applications is well established. MAT and OCA are considered symbiotic procedures due to a complementary spectrum of indications and reciprocal contraindications. However, few outcomes of concomitant MAT and OCA have been reported. This study is a retrospective review of patients that received simultaneous MAT and OCA at a single institution between 1983 and 2007.

Materials/Methods

36 (22 male, 14 female) patients with an average age of 37.1 (15 – 66) years received a total of 38 combined MAT and OCA procedures between 1983 and 2007. Eight patients were lost to follow-up, leaving 28 patients with an average follow-up of 80.7 (22 – 171) months. 24 patients received a lateral meniscus, 11 received a medial meniscus, and one patient received bilateral MAT. The average number of OCAs was 1.9 per patient, with an average graft area of 16.9 cm^2. There were 12 unipolar (tibial), 19 bipolar (tibiofemoral), and 5 multifocal lesions. 32 MAT constituted a compound tibial plateau OCA with native meniscus attached. The most common initial diagnoses were traumatic cartilage injury (52%), osteoarthritis (19%), and degenerative cartilage injury (17%). The average number of previous surgeries was 3.0 (1 – 8) per patient. Patients were evaluated clinically using a modified D'Aubigne and Postel (18-point) scale, pre-operative and post-operative Knee Society Function Score (KS), and reoperation rate. Subjective outcomes were measured using patient questionnaires evaluating satisfaction, pain, and function.

Results

Mean post-operative KS function (n=9) improved from 63 to 86 ($p<0.05$). Post-operative 18-point scores (n=19) improved by a mean of 4.4 points ($p<0.001$). 81% of the procedures were considered successful (18-point score $\geq$ 15). There was no difference in average 18-point score for successful medial vs. successful lateral compartment procedures. Eight of the remaining patients (29%) failed: One underwent revision OCA (meniscus remained intact), one went on to arthrodesis (deep infection), and six underwent arthroplasty conversions. Average OCA area in successful grafts was15.9 cm^2, and average OCA area of clinical failures was 24.0cm^2. Six of the eight failures (75%) were bipolar lesions with an average OCA area of 26.7 cm^2. Twenty-one (75%) patients completed the subjective evaluation. 100% were either satisfied or extremely satisfied with the surgery, with all reporting less pain and better joint function postoperatively at latest follow up.

Discussion

The overall success rate of concomitant MAT and OCA was comparable with reported results for either procedure in isolation. While the low power of the failures (n=8) prevents conclusive determination of failure mechanism, there are several trends that warrant consideration in formulating future treatment algorithms. Six out of eight failed grafts were bipolar (constituting 32% of the total bipolar/tibiofemoral grafts), whereas only one of twelve (8%) of unipolar/tibial grafts failed. Accordingly, OCA area of reported failures (24.0cm^2) was greater than the average OCA area of the successful procedures (15.9 cm^2). Six of the failures involved a lateral meniscal allograft (24% of total lateral MAT), two a medial meniscus graft (17% of total medial MAT). These results mirror the widely reported effect of overall disease burden and disease progression on the efficacy of cartilage repair procedures, and apparently confirm the meniscal dependency of the lateral compartment of the knee joint. While cause and effect is not clearly established, the comparatively better results in less advanced, unipolar disease could suggest that there is a chondroprotective benefit to early intervention that might merit a lower treatment threshold for combined MAT and OCA.

Conclusion

The combination of MAT with OCA successfully avoided further surgery in 71% of patients and resulted in significantly improved function, reduced pain, and complete patient satisfaction. The combined concomitant procedure is a reasonable option in the younger patient with focal cartilage defects and meniscal insufficiency.

ALL-INSIDE ARTHROSCOPIC LATERAL COLLAGEN MENISCUS IMPLANT: PRELIMINARY RESULTS (20 months follow-up)

M. Marcacci, S. Zaffagnini, G. Giordano, G. M. Marcheggiani Muccioli, D. Bruni, E. Kon

INTRODUCTION

Meniscal suture or replacement is fundamental to prevent knee's osteoarthritis progression after partial or total meniscectomy (1). Even more loss of the lateral meniscus results in a rapidly increased rate of knee degeneration compared to similar medial injuries (2).
Stone and colleagues (3) developed a bioresorbable collagen matrix (Collagen Meniscus Implant) that acts as a scaffold to restore the original meniscal structure.
The purpose of this study was to evaluate preliminary results of a CMI developed for use in lateral meniscus partial deficiencies.

MATERIAL AND METHODS

Twelve patients (mean age 29,6) were prospectively enrolled in our Institute and evaluated 20 months (mean F.U.) after CMI lateral implantation between March 2006 and December 2008.
Inclusion criteria were an irreparable meniscal tear or a previous partial meniscectomy involving the lateral meniscus. Exclusion criteria were knee laxity, untreated grade IV cartilage lesions (Outerbridge classification) and knee alignment deformities.
Fixation of the implant to the host meniscus rim was performed with an all-inside arthroscopic suture technique.
Patients gave informed consent and the study was carried out according to the Good Clinical Practice regulations. Patients were clinical evaluated performing Lysholm, Tegner and VAS (for pain): pre-operative, at 6 months, 1 year and 2 years F.U. Xray control was taken every year post-op and MRI control at 2 years F.U.

RESULTS

There were no complications related to the device. All patients were able to return to activities of daily living without limitations 3 months after surgery.
Follow-up included assessments of changes in Lysholm, Tegner, pain (VAS) and patient satisfaction. Mean values of all these parameters at last F.U. showed a great improvement compared to the preoperative data: Lysholm increased from 68,2 to 92,5; Tegner from 3,2 to 5,8 (only 1,5 less thant pre-injury level); global pain (VAS) decrease from 88,1 to 25,2.

All the patients were satisfied and declare that they will have repeat again the operation.
In the 6 cases that reached e 2 years F.U. MRI showed: in 4 cases mixoid degeneration signal, in 1 a normal signal with reduced size, while the last patient had no recognisable implant. This 6 patients had preserved cartilage and articular space, with no changes since pre-op. control.

DISCUSSION

Our small series of 12 patients prospectively followed for 20 months has shown highly satisfactory results in pain, function, self-assessment and activity levels. Althogh the aspect of the implant was mostly abnormal, the implant was capable to reduce pain and deterioration of the knee joint. Despite that further investigation is needed as the long term follow-up results.

REFERENCES

1. Fairbank T: Knee joint changes after meniscectomy. J Bone Joint Surg Br, 1948; 30;664.
2. Peña E, Calvo B, Martinez MA, Palanca D, Doblaré M: Why lateral meniscectomy is more dangerous than medial meniscectomy. A finite element study. J Orthop Res, 2006; 24(5):1001-10.
3. Stone KR, Rodkey WG, Webber R, McKinney L, Steadman JR: Meniscal regeneration with copolymeric collagen scaffolds. In vitro and in vivo studies evaluated clinically, histologically, and biochemically. Am J Sports Med, 1992; 20(2):104-11.