Knee Arthroplasty: Alternatives, Techniques, & Management Issues

Arthroscopic Debridement: Tunnel Vision?

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In 1997, approximately 340,000 knee replacements were performed worldwide; half were in the United States. While it is difficult to estimate how many debridements were done, most knee surgeons would agree that the number of debridements performed in the United States is probably two or three times greater than the number of total knee replacements; worldwide, the number of debridements performed is approximately 1 million.

**arthroscopic debridement**

The widely used technique of arthroscopic debridement originated in 1934, when Burman "washed out" a knee joint while attempting diagnostic arthroscopy. This positive "wash out" experience has been duplicated by many surgeons, and the literature is clear: lavage is more successful compared to medical treatment or placebo effects.

Debridements initially were done via an arthroscopy and popularized by Magnusson. In addition to a "lavage" effect, "cleaning out the arthritis" (e.g., loose bodies, osteophytes, and degenerative meniscal tears) was attractive (Fig 1). Prudie went one step further and attempted to "create" new cartilage by stimulating the subchondral bone to produce pluripotent mesenchymal cells to manufacture new articular cartilage (Fig 2).

Today, meniscectomies are less injurious than prior arthrotomies. The advantages of arthroscopies are obvious: the capability of confining meniscal resection to the tear alone and minimizing loose body removal through small portals rather than significant arthrotomies.

The biggest enigma with arthroscopic debridements today is the treatment of articular cartilage pathology. A nonaggressive approach to removing loose flaps and smoothing edges, if not trying to laminate the surfaces, is the correct choice. The concern is attempting to regenerate new articular cartilage. This age-old issue has been given new interest through various modalities.

Drilling is the oldest modality of enhancing biological restoration. A 1984 series compared drilling to debridement alone, and the results were equal for debridement and drilling. A more recent study in 1996 concluded that patients did better with debridement alone.

**Abras ion Arthroplasty**

Lanny Johnson popularized abrasion arthroplasty, a concept used to create a fracture 2-3 mm below the surface of grade IV changes, thus stimulating a cellular response to create new fibrocartilage. However, the response produced type I collagen, not type II collagen, which is present in normal articular cartilage. There are many series comparing abrasion arthroplasty and debridements. The consensus is that abrasion does not enhance either the clinical or biological result (Fig 3).
Microfracture, or "pic," is the newest cartilage enhancing method developed by the Steadman group. In this procedure, the base of the lesion is debrided of all fibrous tissue and then a "pic" stimulates a subchondral response. Three- to 4-mm perforations are created. The purpose is to stimulate the marrow cellular reaction without destroying too much bone (Fig 4). Rehabilitation, which includes nonweight bearing, is 3 months.

Six years postoperatively, the authors had some second-look procedures. However, no biopsy results were reported. Since no specific study has reported a consistent ingrowth of hyaline cartilage, it is inconceivable to assume that these results would be any different. Sixty percent to 70% of the "pic" patients improved or returned to their previous activity level, which is typical for any arthroscopic debridement.

**THE FUTURE**

As we enter the next millennium, biological restoration research of articular cartilage is exciting. The success of Carticel, albeit limited, has been encouraging. Specific lesions in the medial or lateral tibiofemoral compartment have the best results. In 1994, Hangody and Karpati developed mosaicplasty and reported 91% good to excellent clinical results, with biopsy specimens revealing normal hyaline cartilage. However, this success may have limited application to the arthritic knee, due to the diffuse rather than localized nature of the arthritic changes.

Is arthroscopic debridement a tunnel vision approach to the arthritic knee? With the aforementioned success, albeit short term, I believe patients (60%-70%) would endorse arthroscopic debridement. Yet, the procedure does not approach the efficacy of total knee arthroplasty. This comparison is indeed the tunnel vision.

**CONCLUSION**

As physicians, we strive for the definitive treatment, a "home run," if you will. Patients often are satisfied with "singles." An experienced knee surgeon has only to marvel at a well-functioning content individual with horrible radiographic arthritic changes to understand this "singles" concept. The patient's enthusiasm for the chondroprotection, the traditional nonsteroidal anti-inflammatory drug (NSAID), new COX-II inhibiting NSAID, etc, can serve to temper our desire for the immediate "home run."

Arthroscopic debridements, by all accounts, are temporizing procedures and should be contrasted with other temporizing modalities for efficacy. It is tunnel vision to compare arthroscopic debridement to total knee arthroplasty—the definitive gold standard in the treatment of the arthritic knee. Yet, arthroscopic debridement should be compared with other modalities, especially the risk-benefit ratio of each treatment. In 1998, more than 5000 deaths were attributed to the use of NSAIDs.

**REFERENCES**