are few data to suggest that this report is anything more than a phenomenon relegated to an isolated or exceptionally rare event.

We look forward to seeing additional research in the area of bioabsorbable implants, but feel that the currently available bioabsorbable anchors have an exceptional clinical safety profile, with very few complications.

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Author's Reply

The letter from Drs. Cole and Provencher underscores many of the points made in the March 2007 article "Biodegradable Shoulder Anchors Have Unique Modes of Failure."[1] I agree that the incidence of problems caused by suture anchors is indeed very low. While no implant is "risk-free," biodegradable anchors have few reported problems and are associated with excellent clinical outcomes.[2,3] As both the letter and article point out, while repair construct failure can occur at the bone, anchor, suture, tendon, or any interface between these components, the suture–tissue interface is the weakest link in the repair construct. New suturing techniques have been developed to address this specific challenge.[4,5]

I agree that technical issues with suture anchor placement, rather than the inherent biomechanical material properties of the anchor, are more likely to result in clinically relevant concerns.[6,7] However, the material properties of any implant (whether an interference screw, plate, or suture anchor) must be fully appreciated by the surgeon so that the technique for using that device appropriately reflects these material limits.

Research has shown that a suture-on-suture anchor eyelet construct (as opposed to a conventional solid suture eyelet) certainly demonstrates consistent ultimate failure strength independent of bone age[8] and a consistent mode of failure: specifically, the suture eyelet pulling out of the body of the anchor[8] in the same manner as was described in one of the sentinel cases. Whether this eyelet type proves to be the "safest configuration available," as Drs. Cole and Provencher suggest, must await prospective outcome data. Based upon their extensive use, the wide variety of biodegradable anchors currently available,[9] and the low incidence of reported problems, it is hard to imagine that one suture eyelet type or any one anchor will demonstrate a clear superiority over the others.

The Arthrex anchor (Bio-SutureTak; Arthrex, Naples, FL) mentioned in the article was introduced in mid-2000. At its release, internal testing of the anchor by Arthrex found the failure strength to be approximately 40 pounds at time zero, decreasing to 27 pounds at 12 weeks. The mode of failure at time zero was a combination of eyelet breakage and suture-eyelet pullout, and at 12 weeks only suture-eyelet pullout (personal communication, Arthrex). While Bio-SutureTak utilization has been 8,000 a month over the years, by 2004 Arthrex received only 10 surgeon reports of failure by eyelet pullout. A revised anchor was introduced in June 2005 that maintained load to failure strength at approximately 40 pounds at 16 weeks, with no change in the degradation profile. No reports of suture eyelet pull out have been received by Arthrex for this revised anchor.

I agree with Drs. Cole and Provencher that intra-articular suture knots have a good track record and are not associated with articular cartilage damage, especially in meniscal repairs. As was pointed out, the arthroscopically tied intra-articular knots in these sentinel cases did not cause articular cartilage damage. However, comparing the low-profile knots of a meniscal repair device with standard shoulder arthroscopic knots does not consider the multiple half-hitches and larger profile of the latter. A more comparable meniscal repair knot (the Mulberry knot) has been associated with articular damage.[10] Every attempt should be made to keep suture material out of direct contact with the articular surfaces.

As the letter points out, the "cases for concern" highlight not only problematic areas related to the biodegradable materials used in suture anchors but also, as was mentioned in the article,[1] the "careful attention [that] must be given to the insertion technique and postoperative regimen." These include insertion angle, depth, eyelet orientation, and secure knot tying.[11]

To conclude, I agree with Drs. Cole and Provencher that biodegradable anchors perform very well, are associated with excellent outcomes,[2,4] and offer significant advantages and decreased risks over metallic anchors. As stated in the discussion section of the article "Complications associated with bioabsorbable shoulder anchors are extremely uncommon and

have not affected the author's continued usage of the product. It should be emphasized that the incidence of these problems is very low indeed."

I appreciate the interest of Drs. Cole and Provencher in this article and their comments that serve to underscore the points made.

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