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Physical Exam for SLAP Lesions— Might as Well Flip a Coin?

ABSTRACTS & COMMENTARY

Synopsis: *Two separate studies, one a case-control and the other a nonrandomized prospective study, question the accuracy of commonly used physical exam maneuvers to diagnose SLAP tears.*

Sources: Stetson WB, Templin K. The crank test, the O'Brien test, and routine magnetic resonance imaging scans in the diagnosis of labral tears. *Am J Sports Med.* 2002;30:806-809; McFarland EG, et al. Clinical assessment of three common tests for superior labral anterior-posterior lesions. *Am J Sports Med.* 2002;30:810-815.

A HIGHLY SENSITIVE AND SPECIFIC DIAGNOSTIC PHYSICAL EXAM test for SLAP tears has been an enigma since Snyder and colleagues¹ first classified these lesions in 1990. Snyder suggested that patients with SLAP tears had pain with overhead activities and often painful catching, popping, or locking within the joint. They described a compression rotation test to evaluate for the lesion. Since that time, many authors have recommended various physical exam maneuvers to try to more accurately diagnose the lesion. Their initial reports often indicate high sensitivity and specificity, but many have questioned the reliability of these exams. In these 2 studies, the researchers have attempted to independently evaluate 4 of these recommended tests.

The first study by Stetson and Templin is a nonrandomized, prospective study of 65 patients with shoulder pain. They evaluated the O'Brien² and crank tests described by Liu and associates³, and also MRI used in 49 patients. These patients all underwent nonoperative treatment for at least 3 months prior to arthroscopic evaluation. Twenty-three patients received subacromial injections of cortisone when indicated for bursitis or a partial rotator cuff tear. Twelve patients were found to have biceps lesions, 10 patients had Type II SLAP lesions, and 2 patients had Type IV lesions. Fifty-eight of the 65 patients had significant inflammation in the subacromial space, and only 7 had no evidence of bursitis. In this group of patients, the crank test had a specificity of 56%, a sensitivity of 46%, a positive

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predictive value of 41%, and a negative predictive value of 61%. The O'Brien test had 31% specificity, 54% sensitivity, a positive predictive value of 34%, and a negative predictive value of 50%. The addition of MRI improved specificity but not sensitivity.

The second study by McFarland and associates is a case-control study of 604 surgical patients over a 7-year period. These patients were retrospectively reviewed as a consecutive case series. Of these patients, 178 were excluded for various reasons, leaving a study group of 426 patients. These patients were evaluated with Snyder's original compression rotation test, the active compression test (O'Brien), and the anterior slide test described by Kibler.⁴ Thirty-nine patients had pathological SLAP lesions classified as Type II-IV by Snyder. Of these patients, all had associated diagnoses and 30 of 39 had intraarticular lesions to include partial or full thickness rotator cuff tears, Bankart lesions, Hill-Sachs lesions, or glenohumeral arthritis. Even with this amount of pathology, no patient had a positive result on all 3 tests, and only 14% had a positive result on 2 of 3 tests. The compression rotation test had 24% speci-

ficity, 76% sensitivity, a positive predictive value of 9%, and a negative predictive value of 90%. The anterior slide test had 8% specificity, 84% sensitivity, a positive predictive value of 5%, and a negative predictive value of 90%. The active compression test (O'Brien) had 47% specificity, 55% sensitivity, a positive predictive value of 10%, and a negative predictive value of 91%.

■ COMMENT BY COL PATRICK ST. PIERRE, MD

These papers independently try to quantify the accuracy of currently used diagnostic examinations for SLAP lesions. Although the studies had different study designs, a different number of patients studied, and different tests were considered, their conclusions were the same. The O'Brien active compression test, anterior slide test, crank test, and compression rotation test all were not reliable enough to be used as screening or diagnostic tests for SLAP lesions. Their results were significantly poorer than those found by O'Brien, Liu, and Kibler in their original articles.

One important finding is that most of these patients had associated pathology, often confusing the clinical picture, and leading to false-positive findings. This has been a consistent discovery in other studies, leading many authors to state that SLAP lesions usually do not occur in isolation, rather in combination with other lesions. However, most of us have operated on patients with isolated SLAP lesions, but again their symptoms have mimicked other conditions in the shoulder.

Both studies had an average age of 45 years. While older than some of the previous studies, it is not an elderly population. This age group of patients may be experiencing subtle instability, subacromial bursitis, or partial thickness articular rotator cuff tears, all of which could mimic SLAP lesions.

So the question remains, is there a current examination that can reproducibly challenge the superior labrum without also eliciting a response from a torn anterior labrum, partial or full thickness rotator cuff tear, AC or glenohumeral arthritis? Can it be reliable when there is an isolated SLAP lesion, and can it help us distinguish a SLAP lesion from other common shoulder pathology? The authors of these studies say no. Stetson and Templin also added MRI and found it was more specific (better at detecting a true negative finding), but it was not sensitive and had only a 63% positive predictive value. They suggested that the addition of gadolinium may be helpful to the use of MRI but did not evaluate that in their study. The final conclusion of these studies is that arthroscopic evaluation

Sports Medicine Reports,SM ISSN 1524-0991, is published monthly by Thomson American Health Consultants, 3525 Piedmont Rd., NE, Bldg. 6, Suite 400, Atlanta, GA 30305.

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GST Registration Number: R128870672.
Periodical postage pending at Atlanta, GA.

POSTMASTER: Send address changes to **Sports Medicine Reports**, P.O. Box 740069, Atlanta, GA 30374.

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remains the best procedure for the diagnosis of SLAP tears. Reliance on these physical exam tests alone cannot be made at this time.

These studies are well done, and I believe their conclusions to be valid. However, a prospectively blinded study comparing physical exam with evaluation by intraarticular gadolinium MRI would be an obvious next step. The treatment of these patients has not changed. Patients are usually recommended for surgery after failure of nonoperative treatment for 3-6 months and a suspicion of intraarticular pathology. Although every effort is made to ensure an accurate preoperative diagnosis, the surgeon should be prepared to treat the entire gamut of shoulder pathology at every surgical setting. The decision to go to surgery should not be made on a positive physical exam test alone. ■

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Capsular Elongation in Recurrent Anterior Shoulder Instability

ABSTRACT & COMMENTARY

Synopsis: *Using a new, MRA-based method in live patients, this study was able to demonstrate capsular stretch with traumatic shoulder dislocations.*

Source: Urayama M, et al. Capsular elongation in shoulders with recurrent anterior dislocation. *Am J Sports Med*. 2003; 31(1):64-67.

ALTHOUGH CAPSULOLABRAL DETACHMENT FROM the glenoid (Bankart lesion) is well recognized as the “essential” lesion in anterior shoulder instability,

permanent deformation (stretch) of the capsule has also been well characterized. The purpose of the present study was to attempt to quantify the amount of capsular deformation with magnetic resonance arthrography.

Twelve patients (11 men and 1 woman) with recurrent traumatic anterior dislocations of the shoulder were studied. The patients studied had an average of 2 previous dislocations (range, 1-4). Both shoulders were studied with the uninvolved shoulder serving as a control. Urayama and colleagues injected 10 cc of gadolinium into the subjects' shoulders and studied selected axial and coronal MRI views. Using special image analyzing software, the capsular length was measured and recorded for those views and compared to the opposite shoulder. The values were normalized based on the size of the humeral head and were statistically evaluated.

All 12 patients had a Bankart lesion. The anteroinferior capsule was elongated an average of 16-19% more than the opposite (control) side. The inferior capsule was elongated an average of 12-29%. Urayama et al suggest that the capsule should be addressed (capsular shift, plication, shrinkage, etc) at the time of Bankart repair. Urayama et al note several limitations of their study, including not considering the possible effect of different volumes of gadolinium, technical issues regarding the plane of imaging, the effect of scar tissue, the effect of dominant vs nondominant shoulders, and the relatively small numbers of dislocations in their patients.

■ COMMENT BY MARK D. MILLER, MD

Biomechanical studies have demonstrated that capsular deformation does occur with anterior shoulder dislocations. Other studies have shown that stretching of the capsule is progressive—that is, the more dislocations, the more stretching. That is why Urayama et al were correct to point this out as a limitation of their study: Their subjects only had an average of 2 dislocations each. I believe that they are correct, however, in their recommendation to address this capsular laxity at the time of surgery. This can be done with open techniques (capsular shift) or arthroscopic techniques (plication or possibly thermal shrinkage). It would be interesting to perform these procedures in their study population and repeat their measurements.

Although attempts to measure capsular laxity by measuring volume in vivo have demonstrated reduction in these volumes following capsular shift procedures, the technique used to measure volume (injection and aspiration of saline) was variable, and only a

small percentage of the fluid injected was recovered.¹ We have studied capsular volume reduction in vitro in a cadaver model and found that humeral-based capsular shifts result in more volume reduction than glenoid-based shifts.² The next phase of this research will compare these results with arthroscopic techniques.

The technique that Urayama et al described may be of benefit to future clinical studies. It would be interesting to use this technique to study patients with atraumatic shoulder instability. Capsular laxity is the only factor in that group. As noted above, the technique could also be used to compare the outcomes of various surgical procedures. Additional studies with more patients (and more dislocation episodes) may lead to further credibility for the use of magnetic resonance arthrography to study capsular laxity associated with shoulder instability. ■

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It's Not the Knot

ABSTRACT & COMMENTARY

Synopsis: Arthroscopic rotator cuff repair with mattress sutures and standard bone anchors worked reasonably well with no added holding strength provided by using a modified Mason-Allen stitch. Concerns remain that holding strength would still be inferior to transosseous tunnels with a standard open technique.

Source: Schneeberger AG, et al. Mechanical strength of arthroscopic rotator cuff repair techniques. *J Bone Joint Surg Am*. 2002;84-A(12):2152-2160.

ROTATOR CUFF REPAIRS HAVE TRADITIONALLY BEEN performed with open techniques using transosseous tunnels or suture anchors. A modified Mason-Allen suture has been shown to provide optimal holding ability through the cuff. Arthroscopic techniques are gaining popularity as instrumentation improves given the decreased morbidity and perioperative pain. Schneeberger and colleagues compared various anchors and suture techniques for arthroscopic cuff

repair to see if there were any advantages in holding ability of the tendon.

Schneeberger et al used right and left matched human cadaveric shoulders to test 5 different bone anchors: the Revo screw (Linvatec, Largo, FL), Mitek Rotator Cuff anchor (Mitek Products, Ethicon, Westwood, Mass), the 5.0-mm Statak anchor (Zimmer, Warsaw, Ind), the PANALOK RC absorbable anchor (Mitek), and the 5.0-mm Bio-Statak anchor (Zimmer). These were inserted using arthroscopic instruments and tested under cyclic loading to failure. In addition, 5 different types of arthroscopic suture passing instruments were tested for their ability to pass mattress sutures as well as a modified Mason-Allen stitch arthroscopically. These suture passers included the standard Caspari 4-mm slotted jaw suture punch (Linvotec), the mini-straight Caspari suture punch system (Arthrotek, Warsaw, Ind), the ArthroSew (Surgical Dynamics, Norwalk, Conn), the Acufex Suture Punch (Smith & Nephew, Andover, Mass), and the modification of the slotted jaw Caspari Suture Punch with a longer 8-mm needle. Lastly, the holding ability of the tendon was assessed after these various anchors were placed with mattress or Mason-Allen sutures.

There was no significant difference among any of the 5 anchors tested for pull-out strength under cyclic loading. A common finding was that the sutures tended to break for the metal anchors at the eyelet, which tended to have sharp edges. This was not a problem for the absorbable anchors, which tended to have smooth eyelets. The mode of failure was fairly evenly distributed between rupture of suture and anchor pull-out. There was a tendency for the PANALOK RC anchor to have slightly more displacement upon cyclic loading initially, which is in keeping with the different anchoring mechanism to tip and engage the undersurface of the cortical bone. None of the commercially available suture passing devices were suitable for placing a modified Mason-Allen stitch arthroscopically. The standard Caspari Punch needle was too short, and the ArthroSew and Acufex device had needles that were too short or too weak to pass through the tendon. The mini-straight Caspari Suture Punch did retrieve the suture effectively but always damaged it in the process. Only the modified Caspari Punch with an 8-mm long needle could successfully pass the suture through the tendon in a Mason-Allen configuration. More importantly, Schneeberger et al found that the mattress suture was actually better than the modified Mason-Allen suture in combination with an anchor. There was more displacement and a lower load to failure with the Mason-Allen sutures. They theorized that because the sutures with an anchor system are

designed to slide until the knot is tight, this can be done less well with a locking stitch compared to a mattress stitch, which would share the tension equally as the knot is tensioned. Schneeberger et al conclude that the holding strength of all of these available anchors is satisfactory in conjunction with a standard mattress stitch.

■ COMMENT BY DAVID R. DIDUCH, MS, MD

Arthroscopic rotator cuff repair is coming. It is only a matter of time. I feel this is analogous to ACL reconstructions 10-15 years ago when it was rare for the general orthopaedic surgeon to attempt these until instrumentation advanced to the point where reproducibly good results could be achieved by people generally familiar with arthroscopy. Eventually, techniques and instrumentation will advance to the point that arthroscopic cuff repair is commonplace. However, it is not there yet. This paper highlights several major issues with the existing technology.

Firstly, all of the suture passing devices had major problems. They either could not pass the suture through the tissue, damaged it, could not retrieve it, or basically were too flimsy or too short. Only a custom modification of the Caspari Punch with a much longer needle worked. This is a very expensive device that requires quite a large cannular for passing. Newer suture passing devices are evolving, which will surely replace these first-generation devices in due time.

It was interesting to note that there were no major advantages among the anchors. Absorbable anchors cut the suture less frequently at the eyelets than metal anchors. It was a bit reassuring to find that the mattress sutures worked equally if not better than the Mason-Allen suture when placed arthroscopically. This is a relief because it is hard enough to pass a mattress suture arthroscopically, let alone trying to pass Mason-Allen sutures. In fact, a lot of arthroscopic repairs are done with just simple sutures for basic reasons of simplicity. It would be interesting for Schneeberger et al to have studied this in comparison. It would also have been interesting to study the new knotless cuff devices, as they indeed work with a different mechanism.

Schneeberger et al somewhat unfairly state in their conclusion that the arthroscopic techniques for holding ability at roughly 230N are inferior to open techniques with transosseous tunnels at greater than 300N. The modes of failure for each were suture breakage, and they're comparing #3 sutures to #2 sutures and using historical data in the literature. A direct experimental comparison would be more worthwhile, as well as studying other issues such as micromotion of the tendon on the bony surface and, of course, clinical healing. ■

Problem Drinking and Eating Behaviors in College Athletes

ABSTRACT & COMMENTARY

Synopsis: *The prevalence of self-reported disordered eating behaviors or problem drinking behaviors does not differ among intercollegiate athletes as compared with a control population of nonathletes.*

Source: Gutgesell ME, et al. Weight concerns, problem eating behaviors, and problem drinking behaviors in female collegiate athletes. *Journal of Athletic Training*. 2003;38(1): 62-66.

GUTGESELL AND COLLEAGUES COMPARED EATING behaviors and alcohol drinking habits between female college athletes and nonathlete controls at 2 universities. The study population included 149 female varsity athletes in basketball, cross-country and track, lacrosse, rowing, soccer, softball, swimming and diving, tennis, and volleyball who responded to the survey (response rate = 55%). The control population was a convenience sample of 209 nonathlete undergraduate female students. The anonymous questionnaire asked for information related to age, ethnic group, year in school, athlete status, sorority membership, height, weight, and ideal weight. Eating patterns, weight control practices, past or current eating disorders, and problem drinking behaviors were also explored. Binge drinking was defined as 4 or more drinks on 1 occasion at least once during a 2-week period.

Gutgesell et al found that both athletes and controls considered their ideal body weight to be less than their current weight. Approximately 26% of the controls and 18% of the athletes reported a past or current eating disorder such as binge eating, bulimia, or anorexia. Approximately half of the athletes (50.3%) and slightly less of the controls (44%) reported an episode of binge drinking, and both study populations reported they acted in ways they regretted while drinking. The controls reported more occasions of drinking in a 2-week period than the athletes. The percentage of nondrinkers was nearly equal in both groups (controls = 12.8%; athletes = 15.2%). In summary, problems with eating habits and behaviors and binge drinking exist in both athletes and controls, and there appears to be little difference in the prevalence of these problems between the 2 study populations.

■ COMMENT BY DAVID H. PERRIN, PhD, ATC

Team physicians and certified athletic trainers are ide-

ally positioned to prevent what Gutgesell et al describe as subclinical activities (disordered eating, unhealthy eating patterns, occasional binge drinking) and to identify clinical diagnoses such as bulimia, anorexia, or alcoholism in female athletes. From the findings of this study, self-reported problem drinking and eating behaviors exist in both athletes and controls at what appears to be relatively similar rates.

Gutgesell et al point out that both institutions in this study had support systems in place to prevent and treat problems with eating and drinking behaviors in female athletes. These systems included educational programs for coaches, athletic trainers, and athletes on the signs and symptoms associated with eating disorders and drinking problems. Given the relative similarity in these problems among both athletes and controls, one might wonder about the efficacy of these support systems for athletes. On the other hand, one might expect the pressures associated with participation in intercollegiate athletics to predispose athletes to a greater prevalence of disordered eating and drinking abuse. It would be interesting to compare the prevalence of eating and drinking problems among female athletes in institutions with and without the presence of these support systems.

This study reinforces the need for educational programs and a supportive environment to promote healthy lifestyle choices among female intercollegiate athletes. The prevalence of eating and drinking problems in female nonathletes should remind college and university student health care centers of the need for these support systems for all female students. ■

Running, Calcium, and Resistance Training Slow Bone Mineral Density Loss in Females

ABSTRACT & COMMENTARY

Synopsis: Long-distance running did not increase age-related bone loss in females, irrespective of hormonal replacement therapy or menstrual status.

Source: Hawkins SA, et al. Five-year maintenance of bone mineral density in women master runners. *Med Sci Sports Exerc.* 2003;35(1):137-144.

SEVERAL RESEARCH REPORTS HAVE SUGGESTED that long-distance running may not prevent age-

related bone loss in women, may predispose one to osteopenia, or may inhibit the influence of hormone replacement therapy (HRT) on bone. Therefore, the purpose of this study was to determine the effect of long-distance running in 41 women's masters runners with and without HRT, on bone mineral density (BMD) in pre- and postmenopausal women. Over approximately 5 years the women were tested for body composition, maximal aerobic capacity, bone density, training history, and nutritional and menstrual history.

Although some group differences existed for body mass and body composition, they did not change over time. Fitness and training variables were similar between groups and did not change over the time of the study. Calcium intake was similar between the groups and increased over the 5 years of the study. Although the BMD of the hip, spine, and whole body were different between groups, it did not change significantly over time. Statistical analysis supported that age was the only significant predictor of changes in bone between the groups and that exercise did not decrease bone density. Hawkins and colleagues, therefore, concluded that their data demonstrate no significant loss of bone mass over a 5-year period in these masters-level runners with relatively high calcium intakes regardless of menstrual or HRT status. Additionally, the effect of HRT on bone in these runners was not affected.

■ COMMENT BY JAMES R. SLAUTERBECK, MD

Osteoporosis is very prevalent among adult females. Findings that running in elderly females may decrease bone mass could have a huge negative effect on the overall health of the aging female population. Some of the prior studies indicating that bone density is decreased many have been flawed by design because they did not adequately determine that BMD decreased with the onset of running or that bone mineral loss rates in runners were greater than a similar group of sedentary people. Additionally, some recent reports are questioning the efficacy of ERT on the adult females because of cancer and other risks. Therefore, this article will help determine if runners not on ERT are placing themselves at greater than expected BMD loss.

The average BMD loss per year in these masters runners was less than that of the reported value for the average middle-aged woman (0.8 - 1.2%/yr). However, some study design issues must be discussed. Some of the women did some resistance training (40%) in addition to their running programs. Since resistance

training is known to increase bone mass, the effect of resistance training on this study does cloud some of the conclusions. Additionally, most of these runners were on calcium supplementation, and the effect of dose was not controlled. Seventy-five percent of the women in this study met the RDA for calcium supplementation. It is not clear from this article if the effect of calcium could prevent bone loss without exercise or without resistance training, but the effect of all 3 clearly decreases BMD loss. In my opinion, the strengths of the article far outweigh the above concerns. The identification of subjects, testing methods, and data presentation were sound. It is difficult to find women who only run and do not resistance train, and it is equally hard to find women who all take similar supplements.

Therefore, my assessment of this article is that it shows the benefits of running, nutrition, and resistance training in the middle-aged athletic woman to maintain bone mass regardless of menstrual or estrogen replacement status. I support and encourage my active female patients to run, lift weights, and supplement their diets with calcium. Additionally, in these women who cannot take ERT, BMD can be maintained with exercise and calcium supplementation better than the average person. One can only surmise that limiting BMD loss over time will decrease hip fractures in the elderly and ultimately lead to a healthier aging population. ■

Knee Dislocations— What is the Best Treatment?

ABSTRACT & COMMENTARY

Synopsis: *Surgical repair or reconstruction of the cruciate ligaments in patients with traumatic knee dislocations is superior to nonsurgical treatment.*

Source: Richter M, et al. Comparison of surgical repair or reconstruction of the cruciate ligaments versus nonsurgical treatment in patients with traumatic knee dislocations. *Am J Sports Med.* 2002;30(5):718-727.

TRAUMATIC DISLOCATION OF THE KNEE, WHICH TYPICALLY involves damage to both the anterior and posterior cruciate ligaments, is more severe than the more common isolated rupture of a cruciate ligament. The present study evaluates the difference between surgical repair or reconstruction vs nonsurgical treatment.

This was a retrospective study of 89 patients treated for traumatic knee dislocation. To be included, the dislocation had to be traumatic as documented by photograph or radiograph, or involve a complete rupture of the ACL, PCL, and medial and/or lateral collateral ligament. Only patients with at least 2 years of follow-up were included. All patients were examined clinically including KT-1000 arthrometer assessment (Medmetric, San Diego, Calif) of cruciate ligament stability (using the Lachman and inverse Lachman tests) and radiographs. The Lysholm score, Tegner score, International Knee Documentation Committee (IKDC) score, and ability to do work or participate in sports were used to determine outcome. The Jager and Wirth radiologic rating scale was used to measure knee osteoarthritis.

Of the 89 patients evaluated, surgical repair or reconstruction of the cruciate ligaments was performed on 63 (49 repairs and 14 reconstructions; 71%). In the remaining 26 patients (26%), no ACL or PCL repair or reconstruction was performed. A total of 27 patients (30%) underwent a functional rehabilitation program, including none of the patients in the nonsurgical group but all of the patients with cruciate reconstructions (14). Sixty-two patients (70%) were treated with an immobilization regimen.

At an average follow-up of 8.2 years, the outcome in the surgical group was better than for the nonsurgical group in all measured respects as follows: Lysholm score ($P = 0.001$), Tegner score ($P < 0.001$), IKDC activity level ($P = 0.05$), Jager and Wirth ($P = 0.002$), Lachman ($P < 0.001$), inverse Lachman ($P = 0.02$), working ability ($P = 0.006$), and sports ability ($P = 0.004$). Within the surgical treatment group, there were no differences observed between cruciate ligament reconstruction and transosseous fixation ($P > 0.05$). However, transosseous fixation produced better outcomes than did ligament-to-ligament sutures.

Additionally, better outcomes were found in those patients who were 40 years old or younger, had sports injuries as opposed to motor vehicle accident injuries, and had undergone functional rehabilitation instead of immobilization.

■ COMMENT BY BRIAN J. COLE, MD, MBA AND NINA SHERVIN

Although there is an increasing incidence of traumatic knee dislocations due to increased sports participation and the continuing high rate of vehicular trauma, the recommended treatment options are controversial in some centers. The present study sought to evaluate the influence of surgical treatment (reconstruction or repair) vs nonsurgical treatment, as well as other prognostic fac-

tors. Surgical treatment is the prevailing option, although earlier studies have reported good results in nonoperative treatment in patients with closed knee dislocations and no associated neurovascular injuries. The findings of this study suggest that traumatic knee dislocations should be treated surgically, but given the large number of varying factors, the method of cruciate ligament restoration should not be overestimated. In particular, a functional rehabilitation regimen, which requires the high primary stability provided by surgical treatment, should be considered. We agree that surgical treatment is generally the optimal treatment option for the traumatic, multiligament injured knee. ■

CME Questions

Effective with this testing period, *Sports Medicine Reports* is changing its testing procedure. You will no longer need to return a Scantron answer sheet to earn credit for the activity. Please review the text, answer the following questions, check your answers against the key on the following page, and then review the materials again regarding any questions answered incorrectly. **To receive credit for this activity, you must return a CE/CME evaluation at the end of the testing term.**

This testing procedure has proven to be an effective learning tool for adults. If you have any questions about the new testing method, please contact Customer Service at 1-800-688-2421.

22. Difficulty with diagnosis of SLAP lesions by physical exam may be due to:

- increased laxity within the joint mimicking instability.
- the fact that patients with SLAP lesions often have associated pathology leading to false-positive examinations.
- the lack of a single physical exam maneuver that provides enough reproducible sensitivity to be a good screening test.
- the lack of a single physical exam maneuver that provides enough reproducible specificity to be a good diagnostic test.
- All of the above

23. According to magnetic resonance arthrography measurements, the anterior and inferior shoulder capsule does which of the following with recurrent anterior dislocations?

- Shortens
- Remains the same
- Lengthens
- Tears off the Labrum

24. Which of the following was found to be true with regard to arthroscopic rotator cuff repair?

- Metal anchors tended to cut the sutures at the eyelet.
- There was less suture breakage at the eyelet with absorbable anchors.

- All of the anchors were basically equivalent in holding ability.
- Mattress sutures were actually stronger and tighter than the modified Mason-Allen suture placed arthroscopically.
- All of the above

25. Recent data demonstrate:

- no significant loss of bone mass over a 5-year period in masters-level runners with relatively high calcium intakes and if on appropriate ERT.
- no significant loss of bone mass over a 5-year period in masters-level runners with relatively high calcium intakes regardless of menstrual or HRT status.
- significant loss of bone mass over a 5-year period in masters-level runners with relatively high calcium intakes regardless of menstrual or HRT status.
- no significant loss of bone mass over a 5-year period in masters-level runners with relatively low calcium intakes regardless of menstrual or HRT status.

26. The following are true statements about eating and drinking behaviors among female college athletes *except*:

- Fifty percent of female athletes reported at least 1 episode of binge drinking over a 2-week period.
- Both athletes and controls perceive their ideal weight to be less than their current weight.
- The percentage of nondrinkers among athletes and nonathletes is essentially equal.
- University support systems significantly reduce the prevalence of eating and drinking problems in athletes compared to nonathletes.

27. Which of the following is *false*?

- Traumatic knee dislocations are more common than isolated ruptures of a cruciate ligament.
- Traumatic knee dislocations typically involve tears of both the ACL and PCL.
- Surgical repair or reconstruction of the cruciate ligaments in a traumatic knee dislocation has been shown to produce better outcomes than nonsurgical treatment.
- Functional rehabilitation, age, and method of injury are important prognostic factors in the outcome of patients with traumatic knee dislocations.

Answers: 22(e); 23(c); 24(e); 25(b); 26(d); 27(a)

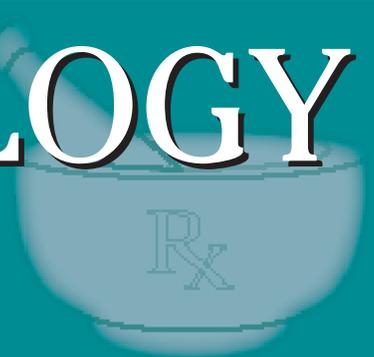
Readers are Invited. . .

Readers are invited to submit questions or comments on material seen in or relevant to *Sports Medicine Reports*. Send your questions to: Christie Messina, *Sports Medicine Reports*, c/o American Health Consultants, P.O. Box 740059, Atlanta, GA 30374. ■

In Future Issues:

Graft Choice in ACL Surgery

PHARMACOLOGY WATCH



Warfarin Effectively Prevents Venous Thromboembolism

Low intensity warfarin therapy effectively prevents recurrent venous thromboembolism, according to a recent study in the *New England Journal of Medicine*. After a median of 6.5 months of full-dose anticoagulation therapy, 508 patients with idiopathic venous thromboembolism were randomized to placebo or low intensity warfarin therapy with target INRs of 1.5 to 2.0. The study was terminated early after 4.3 years of follow-up due to a marked reduction in recurrent thromboembolism in the low intensity warfarin therapy group. Of 253 patients assigned to placebo, 37 had recurrent venous thromboembolism compared with 14 of 255 patients assigned to low intensity warfarin, a risk reduction of 64% (hazard ratio 0.36; [95% CI, 0.19-0.67]; $P < 0.001$). Major hemorrhage occurred in 2 patients assigned to placebo and in 5 assigned to low intensity warfarin ($P = 0.25$). Death occurred in 8 patients in the placebo group and 4 in the low intensity warfarin group ($P = 0.26$). The composite end point was recurrent venous thromboembolism, major hemorrhage, or death. There was a 48% reduction in the composite end point with low intensity warfarin therapy. Because of the importance of these findings, the journal published the study online more than a month prior to its publication date of April 10, 2003.

Vitamin D Reduces Osteoporotic Fractures

British researchers have reduced the rate of osteoporotic fractures in older adults by mailing low-cost vitamin D3 supplements to study subjects every 4 months. Researchers from Cambridge and Oxford universities randomized 2686 adults age 65-85 (2037 men and 649 women) to 100,000 IU vitamin D3 or placebo every 4 months for 5 years. The active medication and placebo were sent to patients by mail and compliance was tracked by completion of a form. At the end of the study period, 149 fractures were

noted in the control group and 119 were noted in the vitamin D3 group (RR = 0.78). Fractures of the hip, wrist, forearm, or spine were considered osteoporotic fractures, of which 87 were noted in the control group and 60 in the vitamin D3 group (RR = 0.67). The vitamin D treatment was well tolerated and cost less than 1 pound per year. The authors suggest that vitamin D may be a good, inexpensive primary prevention strategy for the prevention of osteoporotic fractures (*BMJ*. 2003;326:469-472).

Adefovir Effective for Hepatitis B Treatment

Adefovir is an effective treatment for chronic hepatitis B, according to 2 studies published in February. The first study from Greece randomly assigned 185 patients (in a 2:1 fashion) with e antigen-negative chronic hepatitis B, to 10 mg of adefovir or placebo daily for 48 weeks. Patients in the adefovir group were significantly more likely to have improvement in histologic abnormalities as shown by liver biopsy compared to placebo (64% improvement [77 of 121] adefovir group, 33% [19 of 57] placebo group; $P < 0.001$). Patients in the treatment group also had reduced hepatitis B virus DNA levels and improved alanine aminotransferase levels compared to placebo. Resistant hepatitis B virus was not noted, and the drug was well tolerated (*N Engl J Med*. 2003;348:800-807). In a second multinational study of

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e antigen-positive chronic hepatitis B, 515 patients were randomized to adefovir 10 mg/d, adefovir 30 mg/d, or placebo for 48 weeks. The primary end point was histologic improvement, which was noted in 53% of the 10 mg group, 59% of the 30 mg group, and 25% of the placebo group ($P < 0.001$ for both dose schedules). Once again, evidence of hepatitis B virus was markedly reduced, and there was significant normalization of alanine aminotransferase levels in both treatment groups. The safety profile of 10 mg/d adefovir was similar to placebo; however, there was a higher frequency of adverse events and renal laboratory abnormalities in the 30 mg/d group. Again no hepatitis B virus mutations were noted in the treatment groups. The authors conclude that 10 mg/d adefovir is a favorable risk benefit profile for long-term treatment of e antigen-positive chronic hepatitis B (*N Engl J Med.* 2003;348:808-816). An accompanying editorial states "we appear to be at the dawn of the new era" in the treatment of hepatitis B (*N Engl J Med.* 2003;348:848-850).

Ibuprofen/Aspirin Study Revisited

Another study suggests that ibuprofen blocks the cardioprotective effects of aspirin. In 2001, researchers showed that ibuprofen may block the COX-1 receptor on platelets, keeping aspirin from binding to the receptor (*N Engl J Med.* 2001;345:1807-1817). Now a new study suggests that ibuprofen may reduce the cardioprotective effect of aspirin. Researchers in the United Kingdom reviewed the records of more than 7000 patients who were admitted for MI, angina, stroke, TIA, or peripheral vascular disease and were given aspirin at discharge.

All survived at least 1 month post discharge. In addition to aspirin, 187 patients were also prescribed ibuprofen and 206 were prescribed diclofenac. The patients who took the aspirin/ibuprofen combination were associated with significantly higher all-cause mortality (hazard ratio, 1.93 [$P = 0.011$]) and higher cardiovascular mortality (hazard ratio, 1.73 [$P = 0.0305$]) compared to patients who took aspirin alone. There was no adverse effect noted with aspirin/diclofenac (*Lancet.* 2003;361:573-574). An accompanying editorial suggests that the lack of effect of diclofenac may be due to its relative COX-2 selectivity. The author also suggests that because of the wide availability of over-the-counter ibuprofen, physicians need to be vigilant and explain this potential drug-drug interaction to patients on aspirin cardioprotection (*Lancet.* 2003;361:542-544).

ACE Inhibitors Favored in Cardiovascular Care

A head-to-head study of ACE inhibitors vs diuret-

ics for the treatment of hypertension suggests that ACE inhibitors are better at reducing cardiovascular events. The Second Australian National Blood Pressure Study (ANBP2) compared ACE inhibitors to diuretics and a perspective, randomized, open-label study with blinded assessment of end points. More than 6000 hypertensive men and women age 65-84 were followed for a median of 4.1 years. The drug treatment was titrated to a similar level of blood pressure lowering (a decrease of 26/12 mm Hg). The end point was the total number of cardiovascular events in the 2 treatment groups. There were 695 events in the ACE inhibitor group (56.1/1000 patient years) and 736 events in the diuretic group (59.8/1000 patient years). The hazard ratio for the ACE inhibitor group was 0.89 (95% CI, 0.79-1.00 [$P = 0.05$]). The hazard ratio for male patients was 0.83 and for female patients was 1.00. The authors conclude that treatment of hypertension with ACE inhibitors leads to better cardiovascular outcomes than treatment with diuretics, particularly in older men (*N Engl J Med.* 2003;348:583-592). The results of this study seem to contradict the recently published ALLHAT study which showed better outcomes with diuretics (*JAMA.* 2002;288:2981-2997).

Digoxin Dosing and Heart Failure

If digoxin is to be used in men with heart failure, serum digoxin concentrations (SDC) are optimal between 0.5 to 0.8 ng/dL, according to further analysis of the Digitalis Investigation Group (DIG) trial. The initial reports of DIG reported that digoxin provided no overall mortality benefit and only modest reduction in hospitalizations among patients with heart failure and depressed left ventricular function. This new study looked at outcomes in 1171 men based on SDC of 0.5-0.8 ng/mL, 0.9-1.1 ng/mL, and greater than or equal to 1.2 ng/mL, compared to 2611 men randomly assigned to receive placebo. The main outcome was all-cause mortality of follow-up of 37 months. The highest SDC were associated with higher all-cause mortality. Patients in the lowest SDC range (0.5-0.8 ng/mL) had a 6.3% lower mortality rate compared with patients receiving placebo (95% CI, 2.1-10.5). Patients in the midrange SDC (0.9-1.1 ng/mL) had no reduction mortality, while patients with the SDCs above 1.2 ng/mL had 11.8% higher mortality rate than those receiving placebo (95% CI, 5.7-18%). The authors conclude that higher serum digoxin concentrations were associated with increased mortality and that the optimal SDC for men with heart failure is 0.5-0.8 ng/mL, and the authors suggest this for the new optimal therapeutic range (*JAMA.* 2003;289:871-878). ■