Editorial Commentary: Core Muscle Injuries or Athletic Pubalgia—Finally the Real Sausage, Not Just the Same Ole Baloney

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Abstract: In their paper "Prevalence of Surgical Repair for Athletic Pubalgia and Impact on Performance in Football Athletes Participating in the National Football League Combine," Knapik et al. cut through the baloney in the literature on "sports hernia" and apply new eyes to the impact of the results of core muscle surgery on young elite athletes trying out for the National Football League (NFL). They found that the players who had surgery did just as well as all the others in and following NFL Combines. Even the players with presumptively residual, MRI findings did well. The paper is superb and identifies, in subtle ways, the importance of magnetic resonance imaging, as well as the role of experience in diagnosing and handling these injuries. The paper is a case control series that extracts tremendous beneficial information for sports physicians, athletic trainers, management, agents, players, and all of us Sunday afternoon, TV-watching football experts.

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Knapik, Gebhart, Nho, Tanenbaum, Voos, and Salata,[1] in their paper "Prevalence of Surgical Repair for Athletic Pubalgia and Impact on Performance in Football Athletes Participating in the National Football League Combine," cut through the baloney in the literature on this subject and produce the real stuff: true Bologna sausage from Bologna, Italy. One might say the paper's recipe is spicy. The authors go to the NFL Combine, select out the players who have gotten surgery for this entire set of injuries, and then analyze the players in terms of how they perform. Not only do they do that, but they also tailor the recipe to include a correlation of performance with residual radiologic findings the elite players may still have. The presentation is superb, with savory scents of new nutritious information, which should persuade the appetites of team docs and athletic trainers, as well as agents, team management, players, and the rest of us Sunday afternoon, TV-watching football experts.

Let us critique the recipe and then some of the ensuing savory flavors.

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0749-8063/17147/$36.00

http://dx.doi.org/10.1016/j.arthro.2017.02.005

The Recipe

Sarah Kate Gillingham[2] says there are two main parts to a good recipe: (1) the ingredient list and (2) the preparation method.

The Ingredients

- The authors highlight the term "core muscle injury," which "represents a complex set of extra-articular pelvic injuries involving the abdominal and pelvic musculature." "Core muscle injury" has it all over the misnomer "sports hernia," which (1) misleads the world about the entity's pathophysiology, (2) lumps the wide-ranging types of injuries into merely one type, and (3) then cajoles general surgeons into performing hernia repairs, which, simply said, just don't work well. The resultant baloney can lead to indigestion, and even real harm. The authors use the term "athletic pubalgia" in the paper. This term, introduced by us at a presentation at the 1989 annual meeting of the American Orthopaedic Society for Sports Medicine,[3] remains a good term, although vaguer. The main issue with it is that sports broadcasters (from ESPN and other networks) avoid using it because of the giggles that inevitably get triggered by one of the syllables and the fear of stumbling into an uncomfortable domain of language not typically associated with the sports audience (Stephania Bell,

P.T., O.C.S., C.S.C.S., ESPN Senior Writer and Injury Analyst, personal communication).

- The authors recognize, appropriately, the importance of MRI and the fact that, when properly done and correctly interpreted, that imaging modality has greatly improved the diagnoses and treatments in this set of injuries.
- They see the importance of surgery in select groups of patients with these injuries. Certainly, the players who had surgery represent a wide variety of injuries and surgical techniques. The fact that *surgery* selects out a distinct and scientifically valid group led to a hypothesis that this theoretically varied group would be at higher risk for subsequent diminished performance. One of those limitations of a case-control study like this is the disparity in diagnoses and treatment in the group being studied. Against that hypothesis is the fact that, within this group, many or most of the players likely had surgery at one particular institution with a high success rate, i.e. the group of patients being investigated may actually represent a uniform group with respect to identification of the particular injuries and treatment.

The Preparation Method

1. Artfully, the authors[1] chose endpoints over a four- to five-year period that include draft status, games played, games started, and current status (or not) in the NFL. The endpoints included important retrospective informational ingredients from all players.
2. MRIs were systematically interpreted and compared using Zoga/Meyers techniques.[4] And beyond that, both core muscle and hip pathology were recorded. After all, we are talking about important bone-in filets.
3. Then comes the prospective comparison of players with and without core muscle surgery. The comparison incorporated the evaluation of MRIs with and without residual findings. We don't know if the recipe included, or not, previously described postoperative criteria.[4] We imagine these criteria were considered.
4. A multivariate analysis then took place by age, race, position, MRI residual "positivity," femoroacetabular impingement, and many other items with respect to performance. The comprehensiveness of this portion of the investigation is a big deal. It represents a great deal of work, i.e. another difference between "baloney" and "Bologna."

Savory Flavors

- Fifty-five out of 1,311 (or 4.2%) NFL Combine players had previous core muscle surgery. This number may seem a lot, but it is not. These injuries, in many shapes and forms, are way more common than most people realize. Our own data fit the data presented about who gets the injuries; i.e. defensive backs get them the most, followed by the "skilled" offensive position players, then the rest of the defense; offensive linemen get them the least.[5]
- Consistent with its high reported success rate of the procedure,[6] surgical repair of the injuries made no difference in performance compared with the Combine players who did not have surgery. The authors' findings contrast with a paper about the NHL written by one of my surgical residents.[7] The difference is that the present paper is much better; again, the difference between baloney and Bologna. The other paper was purely Internet based, arbitrary in selection of patients, and focused primarily on veteran NHL players. Many factors other than repair, such as age, contract status, and variability in diagnosis and treatment, no doubt, enter into the playing time of professional athletes in their waning years. A valid comparison for that NHL paper might have included anterior cruciate repairs.
- Half or more of the Combine repair patients who underwent MRI had presumptively residual postoperative MRI ("positive") findings. The players performed just as well as the others whether or not they had surgery. This indicates that residual postoperative MRI findings are common and may have no clinical significance. In our studies, we have found the same thing. Therefore, we developed MRI techniques that can be helpful in distinguishing clinically significant postoperative MRI findings from "normal" ones.
- Why did more offensive linemen have residual MRI findings? The numbers are small, and this is a tangential observation. The authors' speculation, that this results from their large weight and heavy load, seems reasonable. (I shall resist a recipe analogy on this one.)
- Too many people hold to attitudes that these injuries are not "real," suggesting they are all minor injuries that get better on their own. Hopefully, these naysayers will be quieted by the delectable conclusion that fine-tuned MRIs can see most of these injuries. Of course, the gold standard for precise diagnosis and treatment remains with experienced clinical judgment after digestion of all the clinical and radiologic findings.
- Certainly, the most flavorful conclusion of the paper is that athletes with a history of core muscle surgery at the Combines achieved just as much as all the others in the Combine with respect to NFL selection and performance. While selection bias stands out as a limitation of the paper, i.e. players who were not doing well would likely not be at the Combine, the

findings of the paper remain real and important for everybody involved in football and, likely, most other sports.

Perfecting the Recipe

In her blog on recipes, Gillingham[2] says in her "final note": "You must test your recipes to make sure they work, the amounts and serving sizes are correct, and that they taste as great as you intend. If you are 'testing as you go' make sure to take perfect notes. For beginners, and most of us pros, repeat testing and revision are needed. It helps to have other people follow your recipes to see if they actually make sense."

The same can be said about correctly diagnosing and treating the various core muscle injuries. Too much "testing as you go" has been going on. Too many hernia repairs have been taking place. We are doing too many revision surgeries and recognizing way too many hip problems that should have been recognized before the hernia repairs took place. The problem is that the medical field is late in recognizing the reality of these injuries. Coaches and management can no longer say that the player is just "not tough enough." A whole science related to the core has been evolving. For that reason, I have started a two-year fellowship to train young surgeons in this field, and have just now a full textbook on the subject entitled *Introducing the Core*. This shall be published in the near future by Slack, Inc.

It is way past dinner time. It is time to bring a whole set of new recipes into the mainstream of medicine and surgery.

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