

The Preparticipation Orthopedic History and Physical Examination for American Football Players

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Evan A. O'Donnell, MD¹ , Matthew J. Best, MD², and Mark D. Price, MD, PhD¹

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Introduction

The preparticipation orthopedic history and physical (H&P) examination in the National Football League (NFL) encompasses various situations, including the NFL Combine, the preseason entrance examination, and free agent, trade, or waiver deals. The H&P examination forms the foundation to formulate player treatment plans and interventions, monitor and analyze injury patterns, provide guidance and counseling on future performance, and establish risk for the player and organization [1,2].

History

In the preparticipation orthopedic H&P examination, obtaining an accurate and thorough history is paramount. The source for the history is multifaceted. Prior to the player interview, effort should be made to obtain information from athletic trainers and medical staff from prior high school, collegiate, and professional team affiliates. Players will often have draft materials or scouting reports available, which should be accumulated. If available, reports from prior advanced imaging studies should be reviewed for players with prior injury or surgery. Discussion with prior medical staff is helpful, though not always feasible, in obtaining granular detail on player injuries and rehabilitation.

The interview should begin with an orthopedic review of systems (ROS). We find it practical to discuss injury history or treatment by anatomic location. Typically, we start with a discussion of head or neck trauma, including concussion history. Concussion and other neurologic conditions are also thoroughly evaluated by the team's primary care physician, who performs an independent review and assessment of each patient's medical history. The interview then progresses through the axial spine, core musculature, upper extremities, and lower extremities. It is often helpful to

mention specific anatomic regions (eg, wrist, hand, or thumb injuries) to prompt memory of a distant injury and its management. It is not uncommon to have data on a specific injury that the player may not recall. Prompting the player with specifics of timing and laterality may provide further clarity of prior injury. If any are discovered that were not previously known, these injuries are investigated. Knowledge of common treatment algorithms for each injury is helpful as it can expedite the interview (eg, the use of anti-inflammatories, bracing (both type and duration of use), taping, injections or aspirations, procedures). Documentation of the month and year of the injury is helpful for organizing a clear portrayal and timeline of player health. In addition to the management of the injury, the duration of time missed from play including games missed is essential. We find the duration of missed time/games to be the most accurate surrogate for injury severity in the absence of detailed corroborating notes. The athlete's ability to return to play and their subsequent performance are discussed, as well.

After the orthopedic ROS, a problem-focused approach should be used. Each of the known injuries is discussed from date of onset to return to play, including mechanism and context, and how the injury was diagnosed including imaging modalities. Radiographs and axial imaging are often available in the professional athlete and can be obtained to help corroborate the history. The rehabilitation

¹Sports Medicine Service, Department of Orthopaedic Surgery, Massachusetts General Hospital, Boston, MA, USA

²Sports Medicine Service, Department of Orthopaedic Surgery, Johns Hopkins Hospital, Baltimore, MD, USA

Corresponding Author:

Evan A. O'Donnell, MD, Sports Medicine Service, Department of Orthopaedic Surgery, Massachusetts General Hospital, Boston, MA, 02114, USA.

Email: eodonnell4@partners.org

strategy should be noted. This should include specifics of therapy and modalities with trainers. Interventions such as bracing and taping should be noted, as they may be helpful if a recurrent injury develops. Procedures such as aspirations or injections are of particular importance, as they often inform a severity or persistence of the injury. The number and timing of these procedures should be noted. Certainly, surgical interventions should be recorded and discussed. The peer-to-peer discussion of the surgical details, technique, and subsequent recovery is invaluable when the player has yet to return to play.

Physical Examination

The preparticipation physical examination should be thorough and efficient, assessing the spine, core, and upper and lower extremities. History of previous injury or surgery will dictate a more focused examination of a given area. Here, we describe the basic evaluation, with further investigation required for any positive signs found on examination.

Assessment of the cervical, thoracic, and lumbar spine must be included. Motion is assessed with flexion and extension, and axial rotation with care to note any asymmetry in laterality. The spinous processes and subjacent musculature are palpated for tenderness. Axial compression with lateral rotation assesses pars pathology.

The shoulder examination begins with a visual assessment of any deformity, skin changes, or prior surgical scars, followed by assessment of shoulder range of motion (ROM) and strength. Flexion, external rotation, and internal rotation are measured. For the throwing athlete, total arc of motion and supine shoulder ROM can be recorded. Rotator cuff strength is assessed in abduction, external rotation at the side, and belly press. Provocative maneuvers include assessment of superior labral/biceps pathology with O'Brien's sign, posteriorly with a load-and-shift, and anteriorly by apprehension and relocation signs. The clavicle, acromioclavicular joints, and acromion, and long head of biceps are palpated for tenderness.

The elbow examination for most position players involves ROM in flexion, extension and pronation/ supination, and palpation. For the throwing athlete, palpation of the ulnar collateral ligament, a moving valgus stress test, and palpation of the ulnar nerve through the arc of motion are beneficial.

The wrist evaluation is typically limited to flexion and extension ROM. The hand evaluation includes evaluation of neurovascular status, assessment of prior fractures or deformity, and the ability to make a composite fist with normal cascade without malrotation. In particular, the thumb ulnar collateral ligament is evaluated with side-to-side comparison of valgus laxity.

Evaluation for core muscle injury, internal/external oblique, and adductor pathology should be included in a standard examination. The pubic tubercle is palpated. A resisted partial sit-up may also elicit a positive finding.

The ROM of the hips is checked bilaterally. The FADIR (flexion, adduction, internal rotation) test is employed to assess for femoroacetabular impingement syndrome. Strength of the hip abductors, flexors, and hamstrings is assessed.

For the knee examination, inspection is of particular importance. The presence of surgical scars may alert the examiner to prior knee surgery and may provide detail as to the type of surgery if the player does not recall details. Knee effusions may signal more active pathology. Flexion and extension are measured. Collateral ligaments are assessed at 0° and 30°. The anterior cruciate ligament is assessed by the Lachman test, and the posterior cruciate ligament is assessed by the posterior drawer test. The medial and lateral tibiofemoral joint and the patella and its corresponding ligamentous attachments are palpated.

In the foot and ankle examination, ankle ROM is assessed in dorsiflexion and plantarflexion. Anteroposterior and mediolateral stability is assessed with anterior drawer and talar tilt tests. Palpation of the lateral and medial malleolus, fifth metatarsal head, Lisfranc joint, Achilles tendon, and plantar plate can serve as a preliminary examination.

At the culmination of the H&P examination, we provide a clear and objective summary of what we discussed on history and what was seen on physical examination, which will be shared with the player and the coaching staff. We also provide an overall assessment of the musculoskeletal health of the player and their ability to continue play at a high level. The completed H&P form is provided to the player for final review with the physician. The athlete is encouraged to question findings or correct for accuracy. This step is paramount in fostering a relationship between the team physician and athlete.

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Human/Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2013.

Informed Consent

Informed consent was not required for this technical article.

Required Author Forms

Disclosure forms provided by the authors are available with the online version of this article as supplemental material.

ORCID iD

Evan A. O'Donnell  <https://orcid.org/0000-0001-7137-7655>

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