Treatment of Friction Blisters in Professional Baseball Players

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Friction blisters are common among athletes and can have a substantial effect on performance. For example, blisters that occur on the palm or digit of a baseball player’s hand can affect ball control and velocity. A review of the literature reveals few studies on the treatment of friction blisters of the hands, and no studies addressing the treatment of friction blisters in baseball players. This paper presents a treatment regimen for such friction blisters based on a classification system associated with specific therapeutic measures for each stage.

Etiology

Whitfield\(^1\) in 1932 first observed the relationship between moisture and friction blister formation. Naylor\(^2\) confirmed Whitfield’s observations by showing that talc decreases whereas sweat increases frictional forces on human skin. Subsequently, several other authors\(^3-5\) reproduced Naylor’s data in experiments with military recruits.

In the 1960s the U.S. military began to intensely study the evolution and treatment of friction blisters because of the problems they posed for the feet of soldiers. Cortese et al.\(^6\) showed that aspiration of the blister within the first day of formation increased roof adherence to the blister base while decreasing discomfort, infection, and healing time. Akers and Sulzberger\(^3\) advocated the use of adhesive glues, called cyanoacrylates, to protect the open blister bases. When the glue was applied to the blistered feet of military recruits, it decreased blister discomfort and infection.\(^3\) These acrylates were modified over the next 30 years, and in 1998 the Food and Drug Administration approved the use of 2-octyl-cyano-acrylate (Dermabond, Closure Medical Corp., Raleigh, NC) for closure of lacerations.

Blisters and calluses are both due to friction. Blisters develop when acute frictional forces are translated to the statum spinosal or malpighian layer of the epidermis. The spinosal cells are then destroyed, leading to cleavage and cleft formation. This cleft fills with a plasma-like fluid infiltration that creates a typical blister.\(^5-9\) In contrast, calluses form as a result of a chronic process. Repetitive, low intensity, frictional forces cause hypertrophy of the outer (or “horny”) epidermal layer.\(^1,8,10,11\) The overgrowth protects the spinosal cells from frictional force, thus inhibiting blister formation. Calluses, although serving a protective function, can also become a source of skin blistering if not managed properly.\(^1,7,12\) If prominent, the callus translates excessive vertical force to the spinosal cells to cause pain and blister formation.\(^13\)
Blister Classification and Treatment

Based on a review of the literature and our own experience, the development of blisters can be classified into four stages: Stage I, the prodromal phase; Stage II, a fluid-filled blister; Stage IIIA, a collapsed blister with a roof; Stage IIIB, a collapsed blister without a roof; and Stage IV, a healing phase (Table 1). Each stage requires distinct treatment based on the stage of blister at presentation, the evolution of the blister, the timing of blister occurrence during the sport event (game vs. practice), and the player’s position. The total time for a lesion to progress from Stage II to Stage IV is usually 4 days.

Stage I

Stage-I (prodromal) lesions are defined by pain and gross irritation of the superficial soft tissue, indicating a possible development of a fluid-filled blister. Treatment of these “hot spots” focuses on a modification or reduction of the activity to prevent the formation of a fluid-filled blister. For example, a pitcher reduces the number of pitches thrown or a position player reduces the number of swings in batting practice. Batters may also cover the irritated skin with a protective tape such as moleskin, duoderm, or even duct tape. The addition of a protective barrier, such as powder within thicker or padded batting gloves, also can prevent blistering.

Stage II

Stage-II lesions are characterized by a blister cavity filled with serous or serosanguinous fluid. Such blisters should be aspirated with a sterile 25-gauge needle, regardless of the player’s position or the timing of blister occurrence. Aspiration aids roof adherence to the blister base, promotes healing, reduces discomfort, and provides a natural biologic dressing which is believed to reduce the chance of the blister becoming infected.\(^6,11,14,16\) The decompressed blister cleft is treated as outlined below for a Stage-III lesion, allowing the position player to resume play as tolerated.

When a Stage-II lesion forms, a pitcher is immediately prevented from additional throwing in games or practices because continued pitching will only aggravate the lesion and prolong the recovery. Pitching with a blister may also lead to altered mechanics that can increase the stress on the shoulder or elbow. In addition, pitchers with any foreign substance, as detailed in Major League Baseball’s official rule 8.02, are prohibited from pitching in games.

Stage III

Stage-III lesions are defined as blisters that have collapsed. Treatment goals for Stage-III blisters are to decrease pain, promote healing, prevent secondary bacterial infection and, if possible, allow continued participation. Stage-III lesions can be subdivided into

<table>
<thead>
<tr>
<th>Stage</th>
<th>Definition</th>
<th>Treatment*</th>
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<tbody>
<tr>
<td>I</td>
<td>Prodromal</td>
<td>Modification of activity: fewer repetitions, moleskin, double gloves</td>
</tr>
<tr>
<td>II</td>
<td>Blister</td>
<td>Aspirate, P: no throwing; PP: play as tolerated</td>
</tr>
<tr>
<td>IIIA</td>
<td>Collapsed blister with roof</td>
<td>Betadine soaks, injection of triple agents, Band-Aid; P: no throwing, PP: play as tolerated</td>
</tr>
<tr>
<td>IIIB</td>
<td>Collapsed blister without roof</td>
<td>Day 1: Spenco Second Skin, Band-Aid, tape. Day 2: Triple therapeutic agents topically, Band-Aid. P: No throwing, PP: play as tolerated</td>
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<tr>
<td>IV</td>
<td>Dry, flaky, healing skin</td>
<td>Trim roof or flaky, dry dead skin of blister base, apply benzoin/alum 3 times a day for 3 days, then 1 or 2 times a day for 1 week as needed. P and PP: both may play</td>
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*P = pitcher; PP = position player.

Table 1. Staging and Treatment of Friction Blisters in Professional Baseball Players