

Surgical Pearls

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SURGICAL SOLUTIONS FOR TREATING POSTERIOR HEEL DEFORMITIES

Picking the correct surgical procedure is as important as drawing the initial skin incision if you want to ensure an exceptional outcome for your patient. Granted, there is an array of surgical procedures for correcting Haglund's deformity. However, there are some pertinent guidelines you should consider in order to make the correct call.

First, you need to assess the cause of posterior heel pain. This dilemma is usually caused by several of the following:

- a hypertrophied posterior superior surface of the calcaneus;
- a high inclination angle of the calcaneus, which causes its posterior superior surface to tilt backwards, leading to irritation of the Achilles tendon or skin;
- a long horizontal calcaneus; or
- Achilles insertional calcification/exostosis (calcaneal step deformity), which occurs across the distal two thirds of the posterior surface of the calcaneus, leading to irritation of the Achilles tendon.

Keep in mind that biomechanical factors can also contribute to a painful posterior heel in terms of sheer and pressure upon the Achilles tendon and/or skin.

Certainly, you should exhaust conservative treatment measures before looking at surgical options. You may use orthotics for structural and biomechanical faults. Also consider the merits of physical therapy, corticosteroid injections, heel lifts and shoe changes. Be sure to rule out arthritic disease, as well as any other degenerative disease processes, prior to performing surgery.

Is It Haglund's Deformity?

When you analyze a lateral weight bearing X-ray of a patient suffering from Haglund's deformity, be aware that the Fowler-Philip angle of the calcaneus is

usually greater than 75 degrees.¹ However, do not rely upon this measurement as the sole criteria for performing Haglund's surgery. Keep in mind that many patients who had a painful Haglund's deformity had less than a 75 degree Fowler-Philip angle and still needed surgery.

In addition, be aware that several patients who had the Haglund's deformity removed have had recurrences. This is particularly the case when you're treating patients who have high arched feet.

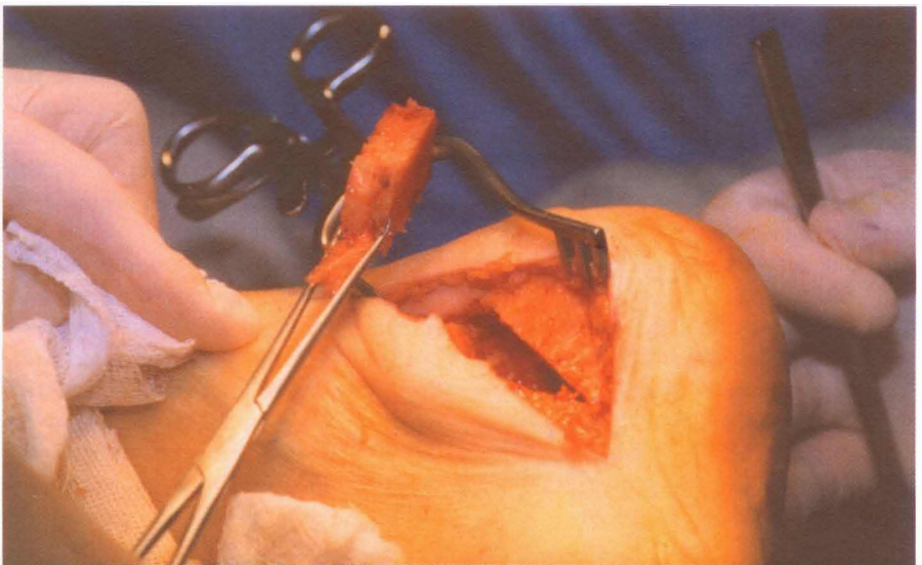
Why is this happening? I believe the

posterior tilt of the calcaneus plays a key factor in recurrence. Therefore, you should also consider Ruch's total angle measurement on the lateral X-ray, the summation of the Fowler-Philip Angle and the Calcaneal Inclination Angle. According to Dr. Ruch, when the sum of these angles is greater than 90 degrees, this is a more accurate diagnostic indicator of a clinical Haglund's deformity.²

When There Is A Normal Or Low Calcaneal Angle

In order to keep this surgical treatment simple, you should address the size, shape and angle of the heel bone. If there is a normal or low calcaneal inclination angle with a hypertrophied posterior superior process, then you should remove this hypertrophied prominence while the patient is in the prone position.

Proceed to make a linear longitudinal incision approximately one cm. lateral to the posterior margin of the heel. Your incision should extend from just above the superior margin of the calcaneus to the distal one third of this bone. Deepen the incision via sharp and blunt dissection, and make sure you retract the sural nerve. Then make a deep incision directly to the



You should consider doing the Keck and Kelly osteotomy (shown above) when your patient has a high arched foot with a high calcaneal inclination angle.

periosteum of the bone. Direct your attention posteriorly, using a periosteal elevator to free up soft tissues from the superior half to one third of the posterior calcaneus.

Perform the dissection anterior and proximal to the Achilles tendon. Keep in mind that you should retract the Achilles medially. Examine the soft tissues directly superior and posterior to the calcaneus and keep an eye out for enlarged retrocalcaneal bursa, which you may excise. Use an osteotome and mallet to resect (lateral to medial) the hypertrophied bone of the superior posterior surface of the calcaneus. Remodel the bone accordingly and rasp it smooth.

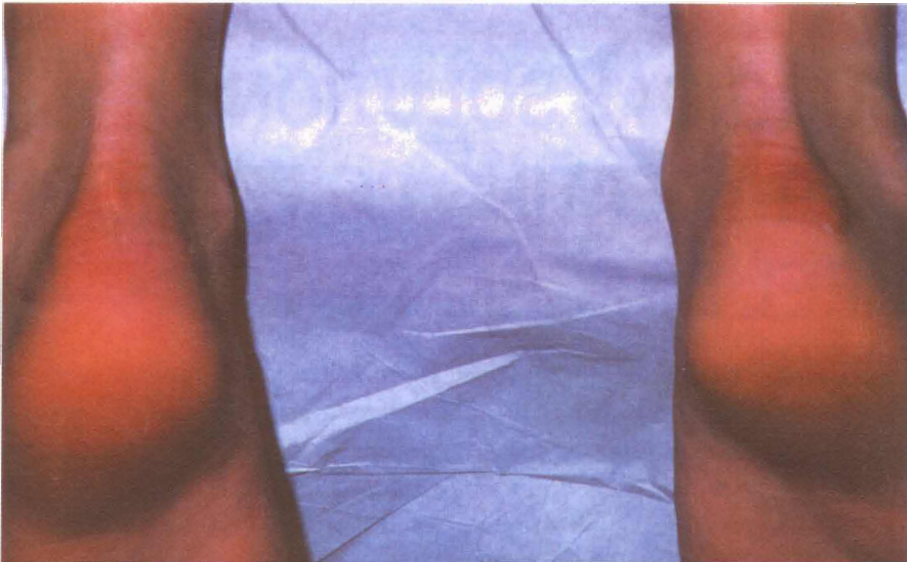
Do a vigorous irrigation. Proceed to reunite and close the soft tissues, using 2-0 vicryl in a simple interrupted suturing technique. Use a 4-0 vicryl suture to close the subcutaneous tissues. Then close the skin by using a running subcuticular suturing technique via 4-0 vicryl or prolene sutures.

Treating A High Arched Foot With A High Calcaneal Angle

When your patient has a high arched foot with a high calcaneal inclination angle, you should consider the Keck and Kelly osteotomy instead of the solitary Haglund's bump removal.

(You may also use this osteotomy to treat the painful Achilles insertional calcification/calcaneal step deformity, providing that you don't see any significant degeneration or thickening of the Achilles tendon. If there is Achilles involvement, remove the step deformity and proceed to repair and re-attach the Achilles tendon via bone anchor.)

When performing the Keck and Kelly osteotomy, shift the posterior heel forward and tilt it upward. This allows you to create a clinical lengthening of the Achilles tendon, which reduces tension at its insertion. With your patient lying in the prone position, use the skin-marking pen to draw the outline of the calcaneus. Make a curvi-linear/hockey stick incision, starting approximately 3 cm. above the superior aspect of the calcaneus and just lateral to the Achilles tendon. Extend this



Take note of the right posterior heel deformity. In order to make the right surgical call, you need to assess the cause of the posterior heel pain.

incision downward around the curve of the calcaneus, coursing along the inferior aspect of the calcaneus and ending near the calcaneal cuboid joint.

What To Look For In Your Dissection

With sharp and blunt dissection, deepen the incision down to the level of the heel bone. Use the wet sponge technique to free the subcutaneous tissues from the periosteum. After the initial incision, make a sharp linear incision. Using a key elevator, sharply dissect the periosteal tissues from the calcaneus. Make sure you expose the dorsal aspect of the calcaneus so you can see the posterior process of the talus. Proceed with further dissection plantar laterally so you can identify the plantar calcaneal tuberosity.

Now direct your attention toward the posterior superior aspect of the heel bone. Examine the bursa. If it is enlarged, proceed with a total bursal excision. In addition, if you see an enlarged posterior superior aspect of the calcaneus (Haglund's bump), dissect it free of soft tissue attachments and resect the hypertrophic bone from lateral to medial with an osteotome and mallet. Then rasp the bone smooth.

Proceed with further dissection so you can examine the Achilles tendon. Pal-

pate the tendon for rough areas or intra-Achilles ossification. If you discover these things, sharply excise them. Also be sure to excise any frayed portion of the visible Achilles tendon.

At this time, if there is a calcaneal step deformity present, you may retract the Achilles medially. If the step deformity is accessible, you may remove it with an osteotome and mallet or bone rasp. However, keep dissection in this area to a minimum. Make sure you keep the distal one-third of the Achilles insertion intact and attached to the posterior surface of the heel bone.

Now focus on the lateral surface of the calcaneus. You should be able to identify the posterior subtalar joint articulation and the lateral plantar calcaneal tuberosity. Given these landmarks, use a marking pen to draw the wedge of bone you want to remove with the apex plantarly. After your initial skin incision, reflect the periosteum away from the calcaneus. Use a wide sagittal saw (Hall blade # 5053-233) for the bone cut.

Proceed To The Osteotomy

Make the initial bone cut perpendicular to the calcaneus and extend it just posterior to the posterior subtalar joint articulation, ending at the plantar aspect of the calcaneal tuberosity. Then you need to

PRUDOXIN™ Cream

(doxepin hydrochloride cream), 5%
NDC 0064-3600-45

For Topical Dermatologic Use Only —
Not For Ophthalmic, Oral, or Intravaginal Use.

INDICATIONS AND USAGE: PRUDOXIN Cream is indicated for the short-term (up to 8 days) management of moderate pruritus in adult patients with the following forms of eczematous dermatitis: atopic dermatitis and lichen simplex chronicus. (See **DOSE AND ADMINISTRATION**.)

CONTRAINDICATIONS: Because doxepin HCl has an anticholinergic effect and because significant plasma levels of doxepin are detectable after topical PRUDOXIN Cream application, the use of PRUDOXIN Cream is contraindicated in patients with untreated narrow angle glaucoma or a tendency to urinary retention.

PRUDOXIN Cream is contraindicated in individuals who have shown previous sensitivity to any of its components.

WARNINGS: Drowsiness occurs in over 20% of patients treated with Doxepin HCl Cream 5%, especially in patients receiving treatment to greater than 10% of their body surface area. Patients should be warned of this possibility and cautioned against driving a motor vehicle or operating hazardous machinery while being treated with PRUDOXIN Cream. Patients should also be warned that the effects of alcoholic beverages can be potentiated when using PRUDOXIN Cream. If excessive drowsiness occurs it may be necessary to reduce the number of applications, the amount of cream applied, and/or the percentage of body surface area treated, or discontinue the drug.

Keep this product away from the eyes.

PRECAUTIONS: Drug Interactions: Studies have not been performed examining drug interactions with PRUDOXIN Cream. However, data are available regarding potentially significant drug interactions regarding doxepin. As plasma levels of doxepin similar to therapeutic ranges for antidepressant therapy can be obtained following topical application of PRUDOXIN Cream, it would not be unexpected for the following drug interactions to be possible following topical PRUDOXIN Cream application.

MAO Inhibitors: Serious side effects and even death have been reported following the concomitant use of certain orally administered drugs chemically related to doxepin and MAO inhibitors. Therefore, MAO inhibitors should be discontinued at least two weeks prior to the initiation of treatment with PRUDOXIN Cream. **Cimetidine:** Cimetidine has been reported to produce clinically significant fluctuations in steady-state serum concentrations of various tricyclic antidepressants. Serious anticholinergic symptoms have been associated with elevations in the serum levels of tricyclic antidepressants when cimetidine therapy is initiated. Additionally, higher than expected tricyclic antidepressant levels have been observed in patients already taking cimetidine. In patients who have been reported to be well-controlled on tricyclic antidepressants receiving concurrent cimetidine therapy, discontinuation of cimetidine has been reported to decrease established steady-state serum tricyclic antidepressant levels and compromise their therapeutic effects.

Alcohol: Alcohol ingestion may exacerbate the potential sedative effects of PRUDOXIN Cream.

Drugs Metabolized by P₄₅₀IID6: A subset (3% to 10%) of the population has reduced activity of certain drug metabolizing enzymes such as the cytochrome P₄₅₀ isozyme P₄₅₀IID6. Such individuals are referred to as "poor metabolizers" of drugs such as desipramine, dextromethorphan, and the tricyclic antidepressants. These individuals may have higher than expected plasma concentrations of tricyclic antidepressant when given usual doses. In addition, certain drugs that are metabolized by this isozyme, including many antidepressants (tricyclic antidepressants, selective serotonin reuptake inhibitors, and others), may inhibit the activity of this isozyme, and thus may make normal metabolizers resemble poor metabolizers with regard to concomitant therapy with other drugs metabolized by this enzyme system, leading to drug interactions.

Concomitant use of tricyclic antidepressants with other drugs metabolized by cytochrome P₄₅₀IID6 may require lower doses than usually prescribed for either the tricyclic antidepressant or the other drug. Therefore, co-administration of tricyclic antidepressants with other drugs that are metabolized by this isoenzyme, including other antidepressants, phenothiazines, carbamazepine, and Type 1C antiarrhythmics (e.g., propafenone, flecainide and encainide), or that inhibit this enzyme (e.g., quinidine), should be approached with caution. Concomitant use of PRUDOXIN Cream with drugs metabolized by cytochrome P₄₅₀IID6 has not been formally studied.

Carcinogenesis, Mutagenesis, Impairment of Fertility: Carcinogenesis, mutagenesis, impairment of fertility studies have not been conducted with doxepin hydrochloride.

Pregnancy: Pregnancy Category B. Teratology studies have been performed in rats and rabbits at oral doses up to 8 times the typical human dose (based on a mg/kg basis) and have revealed no evidence of impaired fertility or harm to the fetus due to doxepin. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, this drug should be used during pregnancy only if clearly needed.

Nursing Mothers: Doxepin is excreted in human milk after oral administration. There have been no studies conducted to date to determine if doxepin is excreted in human milk after topical administration; however, it is known that significant systemic levels of doxepin are obtained after topical administration. It is therefore possible that doxepin could be secreted in human milk following topical administration.

One case has been reported of apnea and drowsiness in a nursing infant whose mother was taking an oral dosage form of doxepin HCl.

Because of the potential for serious adverse reactions in nursing infants from doxepin, a decision should be made whether to discontinue nursing or to discontinue the drug, taking into account the importance of the drug to the mother.

Pediatric Use: Safety and effectiveness of PRUDOXIN Cream in children have not been established.

ADVERSE REACTIONS:

CONTROLLED CLINICAL TRIALS:

Systemic Adverse Effects: In controlled clinical trials of patients treated with Doxepin HCl Cream 5%, the most common systemic adverse effect reported was drowsiness. Drowsiness occurred in 22% of patients treated with Doxepin HCl Cream 5% (and 2% of patients treated with placebo cream) and resulted in the premature discontinuation of the drug in approximately 5% of patients treated.

Other systemic adverse effects reported in approximately 1 to 10% of these patients included: Dry mouth, dry lips, thirst, headache, fatigue, dizziness, emotional changes, and taste changes.

Other systemic adverse effects reported in less than 1% of these patients included: Nausea, anxiety and fever.

Local Site Adverse Effects: In controlled clinical trials of patients treated with Doxepin HCl Cream 5%, the most common local site adverse effect reported was burning and/or stinging at the site of application. These occurred in approximately 21% of these patients. Most of these reactions were categorized as "mild"; however, approximately 25% of patients who reported burning and/or stinging reported the reaction as "severe". Four patients treated with Doxepin HCl Cream 5% withdrew from the study because of the burning and/or stinging.

Other local site adverse effects reported in approximately 1 to 10% of these patients included: Pruritus exacerbation, eczema exacerbation, dryness and tightness to skin, paresthesias, and edema.

Other local site adverse effects reported in less than 1% of these patients included: Irritation, tingling, scaling, and cracking.

POST MARKETING EXPERIENCE:

Some cases of allergic contact dermatitis have been reported in patients using Doxepin HCl 5% cream.

OVERDOSAGE: Overdosage with a topical product is unlikely; should it occur, the signs and symptoms include: Mild: Drowsiness, stupor, blurred vision, excessive dryness of mouth.

Severe: Respiratory depression, hypotension, coma, convulsions, cardiac arrhythmias and tachycardias. Also, urinary retention (bladder atony), decreased gastrointestinal motility (paralytic ileus), hyperthermia (or hypothermia), hypertension, dilated pupils, hyperactive reflexes.

Management and Treatment:

Mild: Observation and supportive therapy is all that is usually necessary. It may be necessary to reduce the percent of body surface area treated or the frequency of application or apply a thinner layer of cream.

Severe: Medical management of severe doxepin overdose consists of aggressive supportive therapy. The area covered with doxepin HCl cream should be thoroughly washed. An adequate airway should be established in comatose patients and assisted ventilation used if necessary. EKG monitoring may be required for several days, because relapse after apparent recovery has been reported with oral doxepin HCl. Arrhythmias should be treated with the appropriate antiarrhythmic agent. It has been reported that many of the cardiovascular and CNS symptoms of tricyclic antidepressant poisoning in adults may be reversed by the slow intravenous administration of 1 mg to 3 mg of physostigmine salicylate. Because physostigmine is rapidly metabolized, the dosage should be repeated as required. Convulsions may respond to standard anticonvulsant therapy; however, barbiturates may potentiate any respiratory depression. Dialysis and forced diuresis generally are not of value in the management of overdosage due to high tissue and protein binding of doxepin HCl.

DOSE AND ADMINISTRATION: A thin film of PRUDOXIN Cream should be applied four times each day with at least a 3 to 4 hour interval between applications. There are no data to establish the safety and effectiveness of PRUDOXIN Cream when used for greater than eight days. Chronic use beyond eight days may result in higher systemic levels.

Clinical experience has shown that drowsiness is significantly more common in patients applying PRUDOXIN Cream to over 10% of body surface area; therefore, patients with greater than 10% of body surface area affected should be particularly cautioned concerning possible drowsiness and other systemic adverse effects of doxepin. If excessive drowsiness occurs it may be necessary to do one or more of the following: reduce the body surface area treated, reduce the number of applications per day, reduce the amount of cream applied, or discontinue the drug.

Occlusive dressings may increase the absorption of most topical drugs; therefore, occlusive dressings with PRUDOXIN Cream should not be utilized.

HOW SUPPLIED: PRUDOXIN Cream is available in a 45 g (NDC 0064-3600-45) aluminum tube. Store at or below 27° C (80° F). Rx ONLY

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perform a second osteotomy posterior to the initial cut and angle it in such a way that the apex is plantar. Make the cuts through and through from lateral to medial, and excise the wedge of bone. Keep in mind that a typical wedge of bone may be 1 to 1.5 cm wide superiorly. Then feather the apex of the cut with a sagittal blade.

It is important to dorsiflex the foot to close down the osteotomy while feathering the cut. Be careful not to make the osteotomy any wider. It is advantageous to leave the medial periosteum intact. Once you've secured a tight closure, insert one or two of the two prong staples across the osteotomy site to maintain closure.

In order to get the staple flush with both the anterior and posterior portions of the osteotomy, insert the posterior prong of the staple first into the posterior aspect of the calcaneus. Since the posterior aspect is wider than the anterior aspect of the calcaneus, doing it this way will facilitate direct contact of the staple against both cortices of bone.

At this time, you'll usually see a dorsal lip of bone at the posterior superior aspect of the calcaneus. You may remove it with a rotary burr, rongeur or bone rasp.

Irrigate the area with sterile saline solution. Then suture the paratenon of the lateral aspect of the Achilles tendon into the subcutaneous tissues and periosteum with 2-0 vicryl in simple interrupted suturing techniques. Perform further subcutaneous closure by using 2-0 and 3-0 vicryl in simple interrupted suturing technique. Hold the patient's foot at 90 degrees during closure. Close the skin, using 4-0 prolene or vicryl in a running subcuticular suturing technique, and apply well-padded dressings. Place the patient in a posterior splint cast, with the foot at 90 degrees or mildly plantarflexed. Keep in mind that the typical post-op course involves a cast change at 10 days with non-weight bearing status for six weeks.

Final Notes

Performing the Keck and Kelly osteotomy enables you to reduce the Fowler-Philip angle; shorten the entire horizontal length of the heel bone; and reduce the prominence of the posterior superior calcaneus, not to mention reducing the tension of the Achilles tendon upon its insertion. While you may find it more time-consuming and/or technically difficult to perform the calcaneal osteotomy, more often than not, it is the correct surgical procedure. ■

References

- 1) Fowler, A; and Philip, J.F Abnormality of the Calcaneus as a cause of painful heel; its diagnoses and operative treatment. Br. J. Surg 32: 494, 1945
- 2) Ruch, J.A. Haglund's disease. J.A.P.A. 64: 1000, 1974.

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