

V-CAM FOR THE USE OF EXTERNAL FIXATION DEVICES

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INTRODUCTION

The idea of the V-Cam started in 2001 as a reaction to years of patient complaints, frame constraints, and cost issues with the use of external fixation devices. A device had to be created that had all the positive and unique properties of standard external fixation, but without all the problems associated with it. Some unique traits that external fixation allows are the ability to bear weight almost immediately after the procedure and the ability to adjust the frames postoperatively.¹⁻⁴ Standard external fixation in this study will be defined as circular fixators or monolateral fixators with pins and/or wires through the tibia.

ADVANTAGES OF THE V-CAM

Instead of transosseous wires going through the tibia, a well-padded leg sheath with Velcro strapping is attached to rods connecting the foot plate (Figures 1-5). The rods maintain stability between the foot plate and the leg sheath. By eliminating wires through the tibia, there are no pin tract infections or irritations to the leg. A significant amount of weight and bulk are reduced by having no circular fixators or monolateral fixators around the leg; therefore, patients will have fewer worries about bumping the device and will be more compliant to bear weight postoperatively (Figure 6).

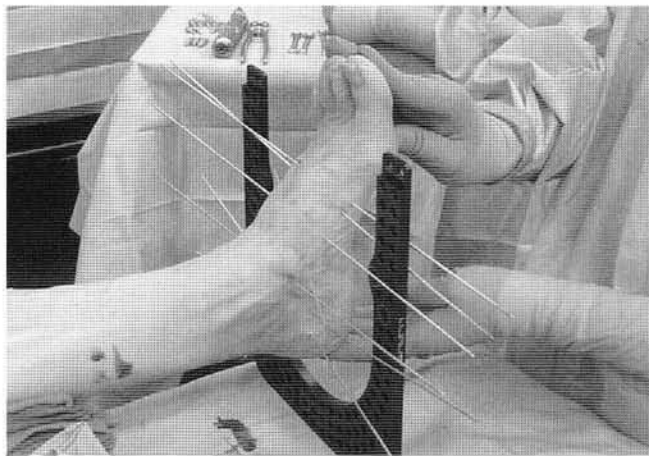


Figure 1. The V-Cam uses a standard foot plate and wires through the foot.

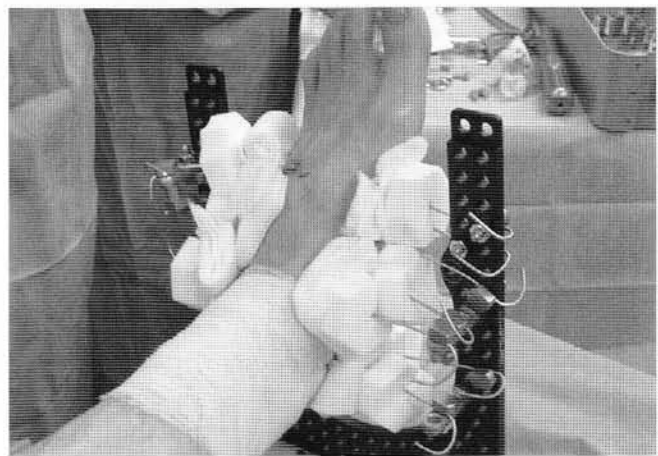


Figure 2. Sterile gauze and padding are then applied around the pin sites of the foot.

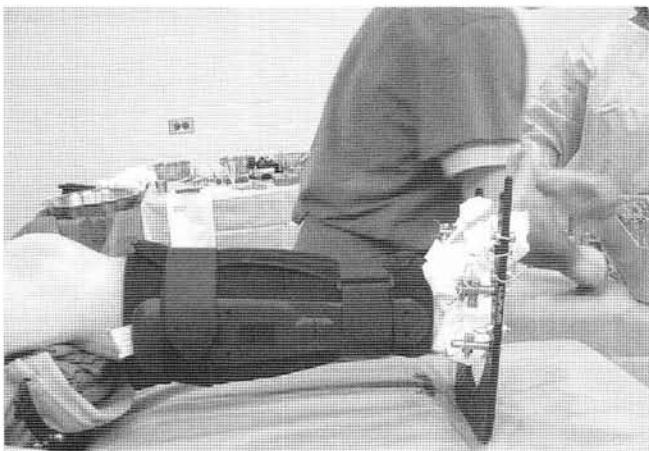


Figure 3. Leg cover is applied with the Velcro strappings.

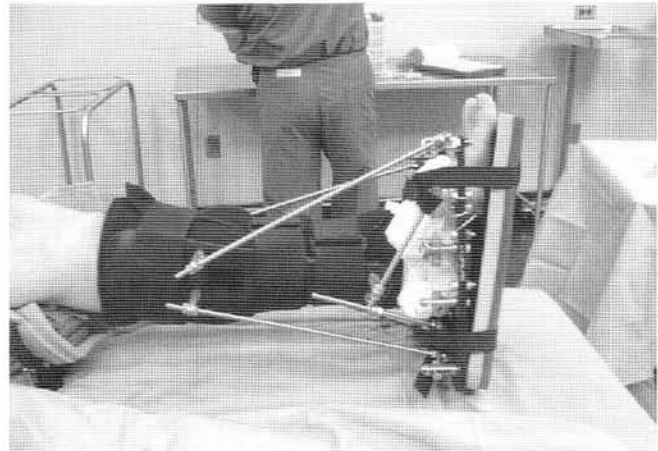


Figure 4. Rods, nuts, and bolts are then attached to the leg cover and the foot plate.

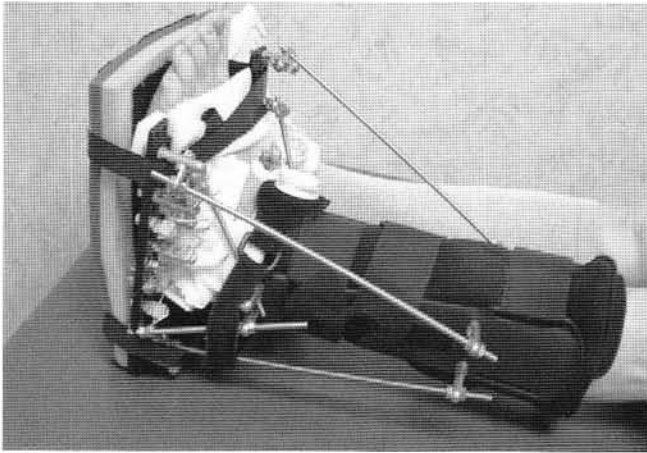


Figure 5A. V-Cam.



Figure 6. V-Cam allows easy access to the foot for cleaning the pin sites.

By eliminating the circular frames and the wires, the cost of the surgery is significantly reduced (a savings of approximately 26% of the overall cost of the surgery.) This allows the surgeon to focus more on the surgery rather than worrying about whether or not a hospital will allow the procedure due to cost issues.

COMPLICATIONS WITH STANDARD EXTERNAL FIXATION

Similar to any surgical procedure, external fixation has its fair share of postoperative complications (Figures 7-9). There are minor and major complications when dealing

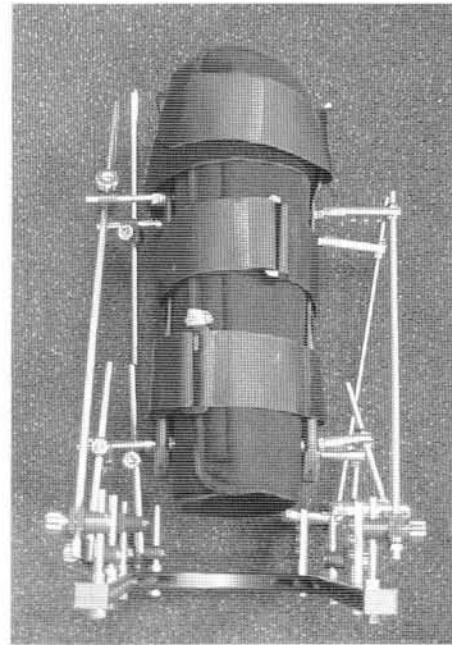


Figure 5B. V-Cam.

with external fixation. Minor complications arise more often than major complications, but to a patient a minor complication may seem extremely severe; therefore, it is imperative that the patient understands the differences beforehand so that all worries may subside when it is only a minor complication.

One of the most common minor complications of external fixation is skin irritation around the pin sites.^{5,6} Generally, this presents with some mild erythema around the pin sites and contains serosanguinous fluid. Reassure the patient that this is a common problem associated with external fixation, it will eventually disappear, and not to be confused with an infection. An infection around the pin site is also a common minor complication and consists of purulent drainage, erythema, calor, and edema. A 1-2 week course of oral antibiotics will usually eliminate the infection. Another minor complication usually involves the breakage of a wire.

If the wire is not needed for the stability of the frame, then replacement is not needed. Otherwise, removal is the best option. Again, the importance of emphasizing that these are common minor complications will minimize patient concerns.

Major complications of external fixation involve more serious problems which can ultimately result in an amputation of the lower extremity or even worse, death.^{7,8} Utmost care and attention should be used when identifying landmarks before drilling wires through the leg to avoid neurovascular bundles. Prompt identification and

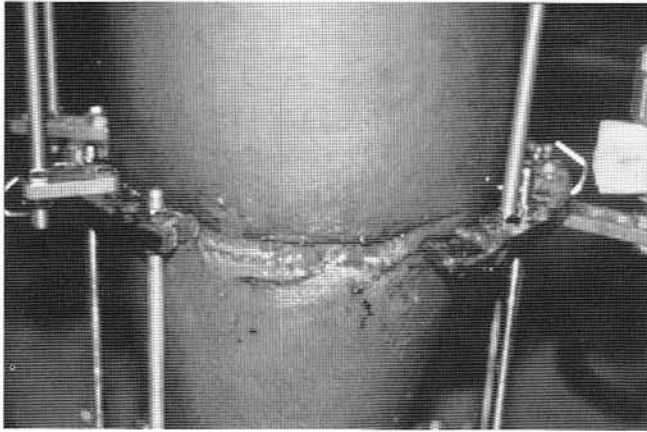


Figure 7. Dehiscence of skin.

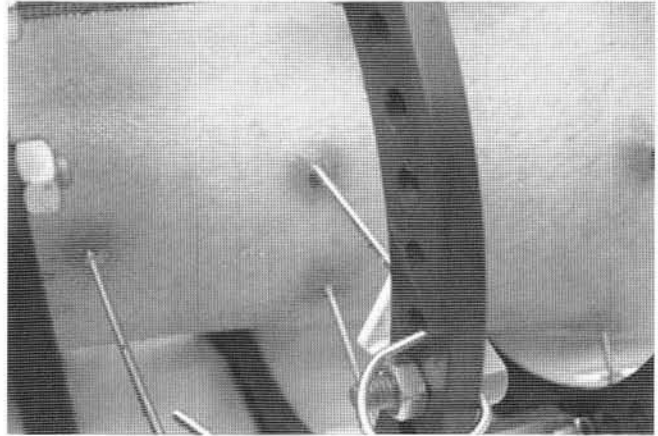


Figure 8. Pin site irritation.

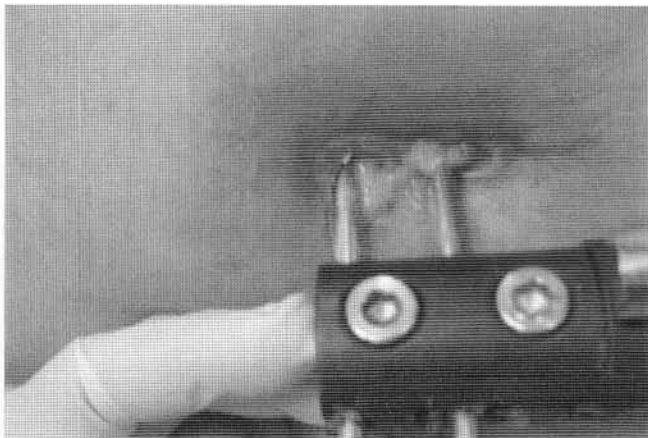


Figure 9. Pin site infection.

treatment of osteomyelitis should always be on the mind of the surgeon if any pin tract infection advances to deeper tissue. With arthrodesis using any type of technique, delayed union and nonunion are always a potential major complication. By careful screening of patients and attention to detail, these major complications can be avoided.

RESULTS

A total of thirty cases were performed with half using the V-Cam and the other half using the standard external fixation (Table 1). The fusion rates were equal between 5 and 7 weeks. Pin site irritation decreased by 80% to the patients in the V-Cam. All patients were full-weightbearing with ankle motion immediately after the procedure.

Table 1

PROCEDURES PERFORMED UTILIZING V-CAM AND STANDARD EXTERNAL FIXATION

	V-Cam	Standard external fixation
Triple arthrodesis	5	5
Charcot fusions	5	5
Midfoot arthrodesis	5	5

DISCUSSION

By eliminating the wires and pins through the leg, the V-Cam decreases postoperative complications, allows all podiatric surgeons in the United States the ability to use external fixation, decreases costs due to less surgical hardware, and allows the patient to be more compliant with postoperative weightbearing. Standard external fixation is an excellent tool to correct foot and ankle deformities, but it has its problems and complications. The V-Cam is a new tool that should be used for most, if not all foot and ankle procedures requiring external fixation because it has all the excellent characteristics of standard external fixation, but without the complications and problems associated with it.

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