

## **Military Speedfix – A New Versatile External Fixator for Combat Injuries**

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### ***ABSTRACT***

*External fixators are the first choice for severe comminuted fractures in long bones on the battlefield. The applied fixators of the different medical services in the NATO are mostly bulky in shape, difficult to mount, unstable or too complex to understand.*

*It was the intend of the NATO working group STANAG 2469 to improve the standards for the external fixation of long bones. The Italian proposal for a general fixation system was opposed by the US and German delegates in terms of lack of reducibility after mounting, questionable stability and applicability.*

*The German group favours a special military fixator on the basis of the Speedfix (Smith&Nephew). A special design allows the fixation of the clamp for one fragment in one step by one screw or leverarm. The weight, versatility and stability of the new fixator were tested and found to be stable enough also for the femur. It is reducible after mounting and easy to understand (one bar system). The price is also comparable to the common systems on the market.*

*The clinical tests are now under observations. The acceptance by the surgeons is high, the duration of implantation short, and the stability excellent. So we conclude, that the new military speedfix can probably replace the older systems.*

### **INTRODUCTION**

The only option of stabilisation complex fractures of long bones in the field is the external fixator. It allows in a simple and undangerous way the primary stabilisation, also in multiple trauma patients. The general advantages of the external fixation in long bones is the facilitation of transport, reduction of fracture pain and the protection of soft tissues and vessels. Also the symptoms of shock can be reduced. No further extension device is necessary in comminuted or defect fractures. It is also assumed that the stabilisation away from the fracture zone could prevent infection and facilitates the bone and soft tissue debridement. Complex systems cannot fulfill the requirements for military purposes in many ways.

So it was proposed to design not a simple, but simple to understand system, that is versatile to handle, variable for all locations on long bones, it should have only one screw for tightening one element, has to be reducible and inexpensive.

The International Standardization Agreement Ratification –STANAG 2469 / EXTERNAL FIXATION DEVICES FOR BONE INJURIES describes a single bar external bone fixator that is able to hold long bone fragments in place for transportation of the casualty. The fixator has to be stable enough to avoid secondary dislocation during transportation, and must allow the alignment also when it is in place. External fixation in the field is usually necessary for the lower extremities and pelvis. Upper extremity injuries can usually be initially treated with splinting or casting until they reach a definitive care facility. For transport, single bar fixation may be adequate depending on fracture and patient characteristics. It is

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not, however adequate for definitive fixation. Additional bars may be added without anesthesia to enhance stability. Additional pins or significant fracture manipulation would require anesthesia. However, since these are usually open fractures the patient will most likely be returning to the operating room for further debridement.

### **SOLUTION**

We designed a new versatile fixator for long bones that can be implanted easy and in a short time by a relatively simple procedure, can be locked by only 1 clamp screw per element, allows reduction in all directions when it is in place. It is tested for the stability that can withstand bending forces and rotational moments also at a femor site. This unit is consisting of a single bar fixator, 4 (schantz) pins 5mm or 6mm in diameter, and 2 multipin clamps along with insertion instruments. This is to be used at the (Forward Surgical Team) FST level. This system generally conforms with the principles described in the STANAG but is fundamentally different in that it allows fracture realignment independent of pin placement (fig 1 and 2).



**Figure 1: Speedfix (Smith&Nephew) 4 screws per fixation element.**



**Figure 2: "Military Speedfix" Prototype 1 screws per fixation element (Dr.Ing.W.Veith, Heidelberg-Germany).**