Handmade Traction Wrist Tower

Alexander Zolotov, MD

Department of Orthopedic Surgery, Medical Center, Far Eastern Federal University, Vladivostok, Russia


Abstract

Keywords

- wrist tower
- wrist arthroscopy
- distal radius fracture

The article presents handmade traction wrist tower, made from improvised means, which can be an alternative for expensive branded traction devices. The proposed device can be used successfully for wrist joint arthroscopy, as well as for performing various surgical procedures on the wrist and forearm, when traction is needed. This a Level IV study.

Handmade Wrist Traction Tower

An alternative to expensive branded traction devices can be a tower for traction of the wrist joint, made from improvised means. The proposed device is assembled from affordable and inexpensive parts of a standard set of Ilizarov apparatus, a standard hand holder from the “Trumpf” orthopaedic table set. In addition, the S-shaped metal hook is prepared to fix the hand holder to the main support. The cuff from the “Gimmi” pneumatic tourniquet and the handmade foam cushion covered with dermatome can be autoclaved and used for the patients’ fixed position during the procedure. The base of the tower is covered by the foam pillow of rectangular shape, which protects soft tissues of arm from contact with metal parts of the tower.

Clinical Application

Before the surgical procedure, the tower for wrist traction is sterilized in a “Sterrad” machine (Johnson & Johnson) intended for low-temperature sterilization (gas plasma technology) of endoscopes, cameras, light cables, batteries, lenses, probes, microsurgical and general surgery instruments, and many others. Metal parts can be autoclaved partially disassembled. The cuff from the “Gimmi” pneumatic tourniquet and the handmade foam cushion covered with dermatome can be autoclaved too. The sterile device is installed on the side table. The base of the tower is covered by the foam pillow of rectangular shape, which protects soft tissues of arm from contact with metal parts of the tower. The patient’s arm is fixed horizontally to the base of the tower at the level of the cushion using a cuff from the tourniquet set. The finger at the proximal phalanx level are fixed to the hand holder, which is fixed to the top of the device with the S-shaped metal hook. The forearm is flexed at an angle of 90° and is fixed vertically. Distraction of the wrist joint arm is performed with the help of telescopic rods, which are distracted by approximately 5 to 6 cm. The rods are locked in this position with nuts and bolts. Some branded traction devices (“Arthrex,” “ConMed,” “Smith & Nephew”) do not provide the possibility of elbow joint extension with
simultaneous wrist joint traction. The proposed device also does not have this property. It should be recognized that only the firm wrist tower “Acumed” has such a property.

In certain procedures passive rotation of the forearm is crucial. Diameter of the hook is smaller than the diameter of the hole in the arc on the top of the tower. This circumstance makes it possible to rotate the forearm—approximately 45° in one direction (supination) and 45° in the other (pronation).

The proposed device can be modified if needed. Chinese finger traps can be used instead of a hand holder from the “Trumpf” orthopaedic table set. By changing the hole in the arc on the top of the tower, the traction axial distraction force can be directed to the radial side or ulnar side of the wrist. Besides this, the device can be used for thumb CMC arthroscopy (traction on the thumb only). The metal details of the tower may interfere with X-ray examination during surgical procedure. To eliminate this disadvantage, some metal details can be replaced with details from X-ray negative material (e.g., using of carbon fiber ring instead of metal ring).

Our Clinical Series

The proposed device was used for the diagnostic arthroscopy for nine patients aged 16 to 63 years with different wrist joint pathology: SNAC wrist (3), SLAC wrist (1), Kienbock’s disease (3), and rheumatoid arthritis (2). The wrist joint arthroscopy was performed using typical ports (► Fig. 2A). Arthroscopic evaluation of the joint condition helped to choose the optimal surgical procedure. No specific complications connected to use of the handmade wrist tower were revealed.

The proposed device can be successfully used not only for arthroscopy of the wrist joint but also for performing various
surgical procedures on the wrist and forearm when traction is needed (e.g., assembling of the external fixator for the treatment of the distal radius fracture) (– Fig. 2B). The traction tower can be assembled without difficulty from accessible and inexpensive materials. The handmade wrist tower can be used many times.

Thus, the presented handmade traction wrist tower can be used as an adequate alternative for expensive branded traction devices.

Conflict of Interest
None.

References