The principle of spring-loaded points for cervical traction

Technical note

W. James Gardner, M.D.
Neurological Surgery, 822 Keith Building, Cleveland, Ohio

The author describes a skull traction tong devised for bedside application. The instrument eliminates the need for shaving, incising, or drilling.

Key Words: cervical traction • skull tongs • spring loading

This paper describes a new type of instrument for cervical traction, the "skull traction tong." The tong consists of a rigid member that follows the coronal contour of the calvarium. At each end there is a threaded hole which accommodates a screw for advancement of the cone-shaped points through the scalp to the outer table. These points are tilted in the direction of pull, so that with traction they tend to press in rather than pull out (Fig. 1). One of the points is rendered retractable by an enclosed spring calibrated to indicate when a squeezing pressure of 30 lbs is attained. This figure was arrived at as a result of experience with the Gardner skull clamp. Here adequate fixation is accomplished at 40 lbs, which when distributed on each of the two points of the opposing rocker arm is 20 lbs.

*The skull tong is available from Trent Wells, Inc., South Gate, California 90280.

Technique of Application

The entire assembly may be autoclaved, but this is not necessary, since the instrument is designed for emergency bedside application under antiseptic rather than aseptic conditions. The recommended procedure is as follows: the needle-sharp points are removed and placed in a cup of antiseptic solution. The scalp is sterilized by an aerosol spray that coats and penetrates the hair through to the skin. The antiseptic is then rubbed in, a local anesthetic is injected, and time is allowed for it to take effect. After respaying the scalp, the instrument is reassembled and applied so that the instructions face upward. As the tapered points are advanced, the skin is stretched increasingly snugly about them. This effectively seals the point of entry and prevents bleeding.

On encountering bone, the stiff spring yields until the outer end of the spring-loaded point barely protrudes beyond the
When the outer end (arrow) of the spring-loaded point barely protrudes beyond the flat surface, the spring is fully compressed.

Fig. 2. When the outer end (arrow) of the spring-loaded point barely protrudes beyond the flat surface, the spring is fully compressed.

advancement is rarely indicated, since pressure atrophy allows additional bone penetration without retightening. The depth of penetration is self-limited by a gradual lessening of spring tension accompanied by an exponential increase in the surface area of contact between the tapered points and the bone. The pressure on each point is exactly the same regardless of whether one has been advanced farther than the other. The curve of the instrument allows the traction loop to seek its proper position.

With the patient supine, rotation of the head may be prevented by placing a sandbag under each projecting knurled end. This is particularly important in fractures of the odontoid. In the absence of paralysis or pulmonary problems, an alternating pressure pad will eliminate the need for turning.

Discussion

The tong, applied as recommended, has been left in place for periods of more than 8 weeks with no evidence of infection. It has been used to apply traction in cervical spondylosis, and also to widen the interspace for insertion of the bone plug in anterior interbody fusion. It has been used in one patient with an associated depressed fracture at the vertex. In a mentally disturbed patient, precautions may be necessary to prevent unscrewing of the points.

Address reprint requests to: W. James Gardner, M.D., Neurological Surgery, 822 Keith Building, Cleveland, Ohio 44115.