Ambu® Perfit ACE™ Sizing Study

Cervical Immobilization Collars: A Comparative Sizing Study

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Study Objective: The National Spinal Cord Injury Data Statistical Center estimates that between 7800 and 10,000 new spinal cord injuries occur yearly. This data is believed to be an understatement of the problem. Of the spinal cord injuries reported by mechanism of injury, motor vehicle crashs account for more than 40%, acts of violence are reponsible for another 24%, falls cause more than 22%, and sports and other trauma for the remainder. Rue, McKinzie, et.al. demonstrated that spinal cord patient expenses accounted for more than $1,250,000.00 in medical costs per victim in pre-1989 dollars. (1) Rue DP, MacKenzie EJ, et.al., "Cost of Injury in the United States: A Report to Congress 1989. Institute for Health and Aging, University of California and Injury Prevention Cenbter, The Johns Hopkins University)

It is believed that more than 2-6% of all blunt trauma results in some form of cervical injury, *(2) (Bayless P, Ray VG: Incidence of cervical spine injuries in association with blunt head trauma. J Am J Emerg Med 7:139-142, 1989)*and that spinal immobilization is a very important practice in the pre-hospital setting. All current trauma protocols and practice guidelines (3)(East Trauma Practice Guidelines: http://www.east.org/tpg/chap3body.html) provide that all patients who, as a result of trauma, have experienced or are experiencing any altered level of consciousness, distracting neck pain, neurological deficit, or drug/alcohol intoxication in the presence of trauma be immobilized until a three view spine series with axial CT scans (4) (Bachululis BL, Long WB, Hynees GD, et.al.: Clinical Indications for Cervical Spine radiographs in the traumatized patient. Am J Surg 153, 473-478, 1987)with sagittal reconstructive views through suspicious or poorly visualized areas. (5) (Freemyer B, Knopp R, Piche, J, et.al.: "Comparision of 5-view and 3-view cervical spine series in the evaluation of patients with cervical trauma"; Ann Em Med 18: 818-821, 1989) Unfortunately, mechanism of injury does not reliabily predict spinal injury. (6) (Domeier RM, Evans RW, Swor RA, et al: Mechanism of injury is not a factor in prehospital clinical evaluation of potential spinal injury." Prehospital and Disaster Medicine 11:1141 (1996)

Cervical spine collars are a standard of care item in the prehospital arena. This observer has observed and heard lengthy discourses on the importance of cervical collar use and fitting. A properly fitted cervical spine collar is believed to mitigate against further spinal trauma and provide some pain relief. It does not prevent all motion but is thought to be a preventive and immobilizing measure which should contribute to a more positive outcome for the victim. A poorly fitting collar has many disadvantages. It may actually distract the injury or hyperflex the cervical spine at its extremes. In any case, poorly fitted collars may be more painful and cause patient management problems. *(7) (Podolsky S, Baraff LJ, Simon RR, Hoffman JR, Larmon B, Ablon W: "Efficacy of Cervical Spine Immobilization Methods"; Journal of Trauma, 1983:23(6): 461-464.)*
Many different types and styles of Cervical Collars are currently available for EMS use. In this study we sought to determine how patient habitus and neck sizes could be fit by two styles of cervical collars. One has 4 sizes and the other has 16 possible sizes. This study sought to compare randomly selected people's neck collar sizing by applying the two collars and documenting which size of each product best fitted the given subject. Then compare the neck sizes to determine if people really do fall into four general sizes. Comfort and sizing were noted.

Methods: One hundred and ninety-five random subjects were placed in two different cervical collars. One was a Laerdal® Stiffneck® Select™ the other an Ambu® Perfit ACE™. Sizing was accomplished according to each manufacturers instructions. This was accomplished by six state certified paramedic educators on the faculty of the UTHSC-SA Department of Emergency Medical Technology. These instructors had a combined field and teaching experience of more than eighty years. The six "fitters" operated in three teams at local shopping malls on a Saturday in conjunction with a health fair. The solicitation was made to the participants by asking them if they would participate in a neck collar fitting study. People willingly volunteered to be participants. Fittings were accomplished with the participants seated in a metal folding chair with their feet on the floor. No participant was identified by name and each participant served as their own control. The volunteer demographics were recorded to include age, sex, weight, and height. Sizes were correlated to the four positions of the Laerdal® collar. Number of notches off from the 4 standard sizes of the Stiffneck® Select™ collar, as well as the actual number, for the Perfit ACE™ was noted. In some patients their comfort comparison between collars was also noted.

Results: Visitors at the health fair willingly participated. Of the 195 subjects, 107(55%) were male and 88(45%) were female. The average age was 41.3 years and the average weight was 163.5 lbs; the average height was 5'7". Subjectively, more than half of the participants volunteered that the Perfit ACE™ Collar felt more comfortable.

The Laerdal Stiffneck® Select™ collar has four standard positions which correspond to their other rigid collar, the Stiffneck. These sizes are termed, NoNeck, Short, Regular, and Tall. Using the Stiffneck® Select™ collar, 40 people (20.5%) used the NoNeck, 78 people (40.0%) were fitted in the Short, 60 people (30.8%) fitted the Regular, and 17 (8.7%) were fitted in the Tall. Using the Perfit ACE ™ Collar which permits 16 different fits, the following data was obtained (numbered from #1 to #16): 7,23,17, 22, 12, 24, 20, 22, 18, 11, 7, 5, 8, 2, 8, 0. Sizes 1, 6, 11, and 15 correspond to the Stiffneck® Select™ NoNeck, Shore, Regular, and Tall, respectively.

Examination of the attached figures show that 76.4% of the participants (149) did not fit into the four standard sizes. It is also of interest that 58.3% (87) of the participants were off the standard sizes by more than one notch on the Perfit ACE™.

Conclusion: A surprising number of randomly selected persons who frequented three different shopping malls in San Antonio, Texas were fitted into cervical collars. Their neck sizes fell outside the range that the Laerdal Stiffneck® Select collars were designed to fit by more than 76%. Even if one takes into account the worst case fitting scenario, more than 58% fell between the standard sizes. The Ambu Perfit ACE Collar appears to offer a "better" fit for this group of participants. The degree of immobilization was not determined. A majority of the participants expressed positive feelings towards the fit achieved with the Ambu product, however, this is a subjective finding.

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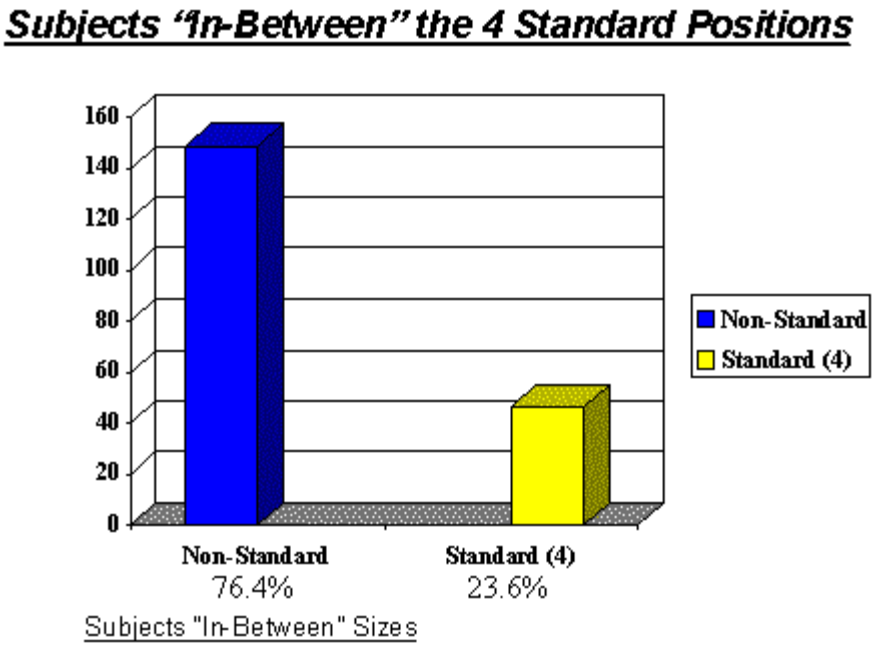

4 Standard Sizes/Position Collar