Subject: SPINAL IMMOBILIZATION

I. Purpose:

To provide guidelines and recommendations for the spinal immobilization of prehospital patients in Santa Cruz County.

II. Core Principles

A. The incidence of true spinal cord injuries from both blunt and penetrating mechanisms is exceedingly low, and occurs less than 1 – 2 % of the time. The incidence of clinically significant spinal cord injuries without neurologic symptoms is exceedingly rare. The best candidates for full head-to-toe immobilization are victims of a high impact mechanism with multi-systems injuries.

B. Most spinal injuries of any consequence present with spinal pain and vertebral tenderness to palpation. Alert and oriented patients with true spinal injuries tend to exhibit pain and tenderness to palpation, and generally vigorously self-splint. Substantial spinal injuries are best recognized with diligent physical exams. In general, ambulatory patients do not have serious thoraco-lumbar injuries.

C. Mechanism of injury without subjective complaints or objective findings of spinal injury is generally a poor predictor of injury. Mechanism of injury should be more carefully considered in high risk patients (elderly and the young) and in those patients for whom an accurate history and physical examination cannot be obtained. Elderly patients and those with preexisting arthritis and other diseases which compromise their skeletal system are more likely to have spinal injuries after a traumatic mechanism; these patients should be more conservatively managed, and there should be a greater suspicion for occult – hidden – spinal injuries, especially in those patients with chronic confusion/dementia.
D. Spinal immobilization should reduce, rather than increase, patient discomfort. Immobilization that increases pain should be avoided. Full spinal immobilization as traditionally practiced has often caused more injuries than it has prevented. Spinal immobilization can be painful, and can induce pressure sores, and needless radiological studies to chase down what is in fact provider-induced pain. Studies have shown that patients in EDs spend anywhere from one to three hours on backboards.

E. The goal of immobilization is to prevent further spinal injury during patient extrication, treatment, and transport. Patients with suspected spinal injuries should be maintained in what is for them a “neutral”, in-line position. This position will vary from patient to patient depending on the presence of arthritis or other spinal abnormalities. A patient’s cervical spine should never be moved if movement increases pain, neurologic deficits, or neck spasms.

F. Immobilization should be accomplished using the most appropriate tools for the specific circumstance. The EMS spinal immobilization tool box may include vacuum splints, pneumatic splints, stiff cervical collars, soft collars, short boards or KEDs, long boards, straps, head immobilization devices (“headbeds”, etc.), tape as well as soft materials such as pillows and pull sheets.

   The County endorses equipment that allows for the comfortable immobilization of patients in such a fashion that further harm is not induced. Equipment choice should abide by the “form follows function” axiom.

   Ill-fitting equipment is worse than no equipment at all. For example, more harm can be caused by a cervical collar that hyperextends a patient’s injured cervical spine than by omitting a collar altogether.

G. Appropriate spinal immobilization depends on an accurate history and physical exam of the spine.

H. Spinal immobilization should not be utilized in order to simply extricate and move a patient.

I. There is no evidence that supine immobilization of the spine is better than placing patients in a semi-fowler’s position. It is also clearly less comfortable.

J. Full spinal immobilization of penetrating thoracic trauma patients increases mortality and morbidity. Alert, neurologically intact victims of penetrating thoracic trauma without spinal pain do not need spinal immobilization.

K. If there is any doubt about the evaluation of a patient’s spine, it is always better to immobilize the patient and defer further spinal evaluation to the ED staff.
III. Immobilization Guidelines

A. Backboards must be appropriately padded to prevent pain and pressure sores.

B. Partial immobilization of a patient with isolated neck pain is acceptable, and encouraged. This may include a stiff or soft collar, use of cervical and thoracic vacuum splinting, pillows, the KED, etc. Patients with isolated cervical pain may be sat up in a semi- or high fowler’s position. Patients who are laid supine will be substantially more comfortable with their knees elevated.

C. Full spinal immobilization (BB, headbed, collar, straps and tape) should be reserved primarily for patients who have received a high impact with resulting multiple systems blunt trauma, and/or who are unable to provide accurate information to field responders. This level of immobilization is more comfortable if vacuum splinting is utilized.

D. Pull sheets, other flexible devices, and concave “scoops” should be employed for moving patients whenever possible; backboards should be used only if these other devices are unavailable.

E. Spinal movement and discomfort are reduced by allowing patients to self-extricate when possible, and to place themselves onto gurneys and spinal immobilization devices. Back-boarding patients from a standing position is discouraged.

F. Patients who truly require immobilization should be placed in equipment that allows for a relatively comfortable maintenance of a neutral position. This can be accomplished with stiff neck or soft foam collars, partial immobilization only of the cervical spine, use of devices such as the KED or vacuum splint technologies, and positioning to include supine, semi-fowlers and even high fowlers positions.

G. Logrolling patients is very uncomfortable and leads to increased spinal movement. The preferred technique to getting patients onto boards is to “forklift” the patient onto the backboard.

H. Responders should document all history and exam findings on the Prehospital Care Report. The patient’s neurologic status pre- and post-immobilization, along with all spinal immobilization interventions, should also be documented.

I. In patients without neck or spinal line back pain or tenderness, ALOC, intoxication, or distracting injury, spinal immobilization may be withheld as long as the patient can be accurately evaluated. The following algorithm should be utilized when deciding whether or not to immobilize a patient’s spine:

IV. Special Procedure for Care of Potentially Spine-Injured Football Athlete

Unless there are special circumstances such as respiratory distress coupled with an inability to access the airway, the helmet should never be removed during the prehospital care of the football athlete with a potential spinal injury.

The facemask should always be removed prior to transportation, regardless of current respiratory status. (Tools for facemask removal include screwdriver, FM Extractor, Anvil Pruners, or ratcheting PVC pipe cutter should be readily accessible). All loop straps of the facemask should be cut and the facemask removed from the helmet, rather than being retracted. The football helmet and chin strap should only be removed if: a) the helmet and chin
strap do not hold the head securely, such that immobilization of the helmet does not immobilize the head; b) the design of the helmet and chin strap is such that, even after removal of the facemask, the airway cannot be controlled nor ventilation provided; c) the facemask cannot be removed after a reasonable period of time; or d) the helmet prevents immobilization for transportation in an appropriate manner.

**If the helmet must be removed, spinal immobilization must be maintained while removing.** In most circumstances, it may be helpful to remove cheek padding and/or deflate the air padding prior to helmet removal.

Shoulder pads do not necessarily have to be removed on-site. **The front of the shoulder pads can be opened to allow access for CPR and defibrillation.**

Should either the helmet or the shoulder pads be removed – or if only one of these is present – then appropriate spinal alignment must be maintained at all times. **It is recommended that if the helmet is removed, then the shoulder pads should also be removed.**
Spinal Immobilization Decision Algorithm

Patient presents with a positive or questionable mechanism-of-injury.

Stabilize C-spine until need for immobilization determined

Patient clinically unstable?

Patient unreliable or at high risk?
- Glasgow Coma Score < 12
- Impairment by drugs or alcohol
- Masking painful injuries
- Acute stress reaction or severe anxiety
- Language barrier

Neurological complaint, deficit or impairment?

Spine pain or tenderness?

Immobilization of Spine NOT Indicated

Immobilization of Spine INDICATED

Patients at Higher Risk for Spinal Injuries
- Maintain a higher index of suspicion
- Child ≤ 8 years, Elderly ≥ 70 years
- History of serious spine problems