Pediatric Trauma Rounds

Emergency Removal of Sports Equipment

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Montreal Children’s Hospital Forbes-Cushing Amphitheatre D-182

This event is approved for 1 credit by the Centre for Continuing Health Professional Education (CCHPE)
POTENTIAL CONFLICT OF INTEREST DISCLOSURE

• “I have no conflict of interest to declare”

• “I have no affiliation, honoraria or monetary support from an industry source”.
Learning Objectives

• Review the challenges of emergency sports helmet/shoulder pad removal in non-controlled and controlled settings.

• Learn the techniques for optimal removal of sports equipment.

• Practice helmet and shoulder pad removal.
• These guidelines are meant to be used as a model for an ideal intervention in a non-ideal situation.

• Mock-ups (simulations) should be done on a regular basis, and especially at the beginning of each season.

• All sports medicine personnel must know their role and have practiced their skills within the last three months to be considered trained and rescue ready responders.
Emergency Removal of Sports Equipment

• Competent pre-hospital management of spine-injured athletes wearing sports equipment is a concern for sports medicine providers.

• Although EMS protocols vary regionally, there are basics that are common and guidelines that can be developed to best meet the needs of the Canadian pre-hospital realities.
• It is assumed that the best-trained, practiced, and equipped personnel are on-site in the best of conditions possible in a field setting.
• Only a hospital emergency room can provide a true ideal "controlled setting".
• Interventions however, need to be commenced immediately and cannot always wait for an ideal setting.
• Since 2005, AED protocols have required chest access which involves cutting of shoulder pad restraints.
• These actions affect pad stability during transfer techniques and transport putting the spine at risk.
Recent updates in CPR/AED (ILCOR 2010) have facilitated the primary survey for sport health-care providers (HCP).

The UCABd approach provides for prompt pulse check, and immediate access to the chest for compressions. Once absence of carotid pulse has been confirmed, the on-site HCP team can often provide simultaneous interventions to ensure rapid and orderly progression of care.
Primary Survey  ILCOR 2010

U\textsubscript{EMS/911}  CABd\textsubscript{DEFIB}

Secondary Survey  Head to toe / PMSC x 4 / Vital Signs

D E F G

Disability (head / spine)  Epidermis  Fracture  General
FOOTBALL URGENT EQUIPMENT REMOVAL

During performance of UCABd on a fully equipped football player, initially all equipment should be kept in place except for urgent access to:

- **Chest** for compressions / defibrillation.
- **Airway** for obstructions/ventilations
Chest Access

Jersey / Shirts

Initially pull up and cut just enough for emergency access to the chest. If difficult or jersey is too tight:
CUT (scissors): neck to waist & mid-line to across each arm.

Shoulder Pad-

CUT laces / material with scissors, CUT plastic plate if present with shears.
Airway Access

**Airway/Ventilation** access involves removal of 2 lateral snubbers and tilting up the faceguard. Airway access is a big challenge and issue in sports with protective equipment and helmets.

Access is important and breaths should be provided promptly: 
**Cardiac Arrest:** after first series of 30 compressions 
**Resp Arrest:** ideally within 30 seconds of determination of respiratory arrest. For athletes, important to repay oxygen debt due to sport activity.

ILCOR has emphasized the need to access and provide breathing. PHTLS has stated that equipment should be removed by best trained on-site (therapists/trainers) ideally before transport.

*(PHTLS 7th edition-2011, page 261, box 10-16 Athletic Equipment Removal).*
A number of recent publications, including a position paper, have advocated the immobilization of helmeted athletes to a long backboard with the helmet in place. A search of the medical literature for supporting evidence reveals that these recommendations are based on, at best, Class III research. Studies criticizing the practice of helmet removal have primarily been done in cadavers. These studies report that extreme hyperextension of the cervical spine occurs when the helmet alone is removed and the shoulder pads are left in place; however, all the studies were done without the placement of appropriate padding under the head to prevent it from falling back onto the backboard. Adherence to proper spinal precautions and application of treatment principles will best accomplish the task of spinal immobilization whether or not the helmet or shoulder pads are removed.

Athletic equipment should be removed by personnel trained and experienced in the removal of sports equipment. Historically, these trained and experienced personnel generally have been those individuals, usually athletic trainers, present at the athletic event site. Emergency medical services (EMS) responders, however, need to receive training in such removal, because access to the airway, if needed, can be accomplished only by appropriate access to the patient's face and head, which requires removal of the facemask at a minimum and the helmet in many cases. If the decision is made not to remove the equipment at the scene, someone knowledgeable in sports equipment removal should accompany the patient to the hospital.

While special care for helmeted athletes is needed, the general principles of spinal immobilization taught in Prehospital Trauma Life Support (PHTLS) courses are appropriate and need to be followed. Ideally, the helmet and shoulder pads should be removed as one unit. However, it is still possible to immobilize a player to a long backboard without causing hyperextension of the cervical spine when the helmet alone is removed. This is accomplished by the appropriate use of padding behind the head to maintain the head in neutral alignment with the rest of the spine if the shoulder pads are not removed. EMS responders must determine the specific medical needs for an injured athlete and take appropriate steps to meet those needs, which may often include immediate removal of the athletic equipment.
Sports Equipment Removal

• Most studies criticizing the practice of pre-hospital helmet removal have primarily been done on cadavers. They show extreme hyper-extension when the helmet is removed, but they did not support the head with occiput pads as would be done in the field.

• Adherence to proper spinal immobilization guidelines should manage the spine whether or not the helmet / pads are removed.

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FOOTBALL: ALWAYS REMOVE FACEGUARD BEFORE REMOVING HELMET

The faceguard (facemask) should always be removed for a suspected spinal.

Research has shown there is less movement of the head/neck during helmet removal when the facemask is first removed.

This is especially true with obese players (ie: linemen) because their helmets tend to fit so tight (skin folds and fat fit all parts of the helmet).

Long face masks also present a challenge with pads still in place and helmet rotation needed to clear face is limited.
Urgent Faceguard Removal (Football)

Three options for lateral snubber removal:

#1) Quick release snubber with QRT (quick release tool)

#2) Power Screwdriver- remove screws from 2 bottom lateral snubbers & tilt up faceguard.

#3) Pruner Shears- cut each snubber at its base with 2 parallel full thickness cuts.

It should take less than 10 seconds per snubber with training and appropriate tools. Snubber removal should allow base of faceguard to be tilted up from helmet.

Careful with tilting up faceguard as often this can cause unwanted movement.

Cut/unsnap chin strap if still on, pry off /deflate cheek pads if in the way.
Remove Faceguard: Unscrew, Cut or Quick Release (now available) snubbers
Technical Service Bulletin
Emergency Removal of Riddell Revolution Faceguards with side mounted Quick Release Hardware
06-07

June 15, 2007

Beginning in the Fall of 2007 a new Faceguard Quick Release Mounting System (figs. 1A and 1B) will be available for Revolution helmets. The Quick Release Mounting System comes standard on Revolution IQ helmets. This system has been designed in such a way that the side faceguard mounting hardware can be easily removed in a matter of seconds. The Quick Release Mounting System provides athletic trainers or emergency medical personnel an alternative to cordless screwdrivers or FM Extractor-type cutting tool when removing the faceguard to secure an airway for an injured player.

When a Riddell football helmet has the new Quick Release hardware attached to it, Riddell recommends the use of this Quick Release System as the primary method of faceguard removal at the side faceguard locations. Should the training staff need or prefer to remove the faceguard with a cutting tool, instructions are also provided below.

The following instructions assume that the injured player has been brought to a supine position using proper emergency care procedures.

INSTRUCTIONS FOR REVOLUTION FACEGUARD REMOVAL WITH THE QUICK RELEASE HARDWARE:

TOOLS REQUIRED: * Riddell QR pin release tool. A ball point pen or other punch like object may also work.
* Cordless screwdriver

1) Disengage Side Mounting Clips: Using the Riddell pin release tool or other suitable object, depress the pin at the center of the Quick Release head (fig. 2). After depressing the pin pull the side clip directly away from the side of the helmet shell as shown (fig. 3).

2) Remove Top Mounting Clips (fig. 4): The Front Pad and the player’s head will naturally apply pressure to the t-nut on the inside of the helmet shell. Remove the stainless steel screw from each Top Mounting Clip using the cordless screwdriver.

3) Disengage Top Mounting Clips from t-nut barrels (fig. 5).

4) Remove the faceguard by pulling directly away from the player’s face (fig. 6).
February 20, 2003

Beginning in the Spring of 2003 the Side Mounting Clip (fig. 1) of the Revolution Faceguard System has been redesigned in such a way that it is easily cut with an anvil pruner-type tool. The reason for this is to provide athletic trainers or emergency medical personnel an alternative to the cordless screwdriver when removing the faceguard to secure an airway for an injured player.

fig. 1

Riddell recommends the use of a cordless screwdriver as the primary method of faceguard removal. Studies have shown the screwdriver to be an efficient tool for emergency faceguard removal. Minimizing movement of the injured player while removing the faceguard is very important. The use of only stainless steel metal fasteners (screws & t-nuts) has eliminated the corrosion that often caused carbon steel hardware to freeze. Refer to the instructions below for Riddell's recommended faceguard removal technique using a cordless screwdriver. Should the training staff need or prefer to remove the faceguard with a cutting tool, instructions are also provided below.

The following instructions assume that the injured player has been brought to a supine position using proper emergency care procedures.

INSTRUCTIONS FOR REVOLUTION FACEGUARD REMOVAL WITH A CORDLESS SCREWDRIVER:

Tools required: Cordless Screwdriver w/ #2 Phillips Bit

1) Disengage Side Mounting Clips. All Riddell helmets come standard with a “Built-In T-Nut Wrench”, either as part of the helmet shell design or as part of the Revolution faceguard attachment hardware (fig. 2). Apply pressure to the t-nut on the inside of the helmet shell (fig. 3). This will keep the t-nut from backing out of the built-in t-nut wrench. Completely remove the stainless steel screw from each Side Mounting Clip using the cordless screwdriver.

2) Remove Side Mounting Clips by pulling directly away from the helmet shell (fig. 4).
3) Remove Top Mounting Clips (fig. 5). The Front Pad and the player's head will naturally apply pressure to the t-nut on the inside of the helmet shell. Remove the stainless steel screw from each Top Mounting Clip using the cordless screwdriver.

4) Disengage Top Mounting Clips from t-nut barrels (fig. 6).

5) Remove the faceguard by pulling directly away from the player's face (fig. 7).

INSTRUCTIONS FOR REVOLUTION FACEGUARD REMOVAL WITH A RATCHETING ANVIL PRUNER:

Tools required: Ratcheting anvil pruner (fig. 8)

fig. 8

1) Cut Side Mounting Clips. (fig. 9) Referencing fig. 10, cut first the portions of the Side Mounting Clip marked "aa", then the portions marked "bb". Insert the cutting blade of the anvil pruner into the slot in the Side Mounting Clip, and cut through the full thickness of the Clip. Four cuts will be required for each Side Mounting Clip.
2) Once all cuts have been made, remove loose pieces of the Side Mounting Clips (fig. 11).

3) Cut Top Mounting Clips. As shown in fig. 12, cut through the full thickness of the Top Mounting Clips.

4) Remove the faceguard by pulling directly away from the player’s face (fig. 13).

Thad Ide
Vice President Research & Product Development
Riddell Inc.
Urgent Helmet Removal (Football)

Urgent helmet removal alone is never a good initial option because shoulder pad removal should theoretically follow immediately to maintain in-line stability.

If athlete was pulseless, compressions should be maintained until face mask is safely removed within a reasonable time (30 seconds).

If rescuers are not familiar with facemask removal technique or do not have the tools: proceed to **Urgent Helmet Removal** with faceguard attached. The cheek pads should at least be removed. This option is more difficult and causes more movement.

Some studies have shown distraction may lead to forms of internal decapitation (Peleg Ben-Galim: Baylor College)
Internal Decapitation
If the decision is made not to remove equipment

- then it should be removed:
  - on the sidelines
  - trainers room
  - ambulance
  - at the very least, someone knowledgeable in sport equipment removal should accompany the athlete to the hospital. However, this is not the ideal choice

Ideally the athlete should not have pads/helmet on for transport as chest access, full airway access is compromised. This is difficult to manage by one paramedic in the back of a moving vehicle if something goes wrong.

- The only rational for leaving equipment on for an unconscious athlete is the absence of trained responders or need for urgent removal from a non-controlled setting.

The choices are made based on scene control and personnel available.
- Ideally fitted helmets and shoulder pads should be removed as one unit.
EQUIPMENT REMOVAL (football)

Spinal precautions in effect.

FACEGUARD REMOVAL:
   Remove two lateral snubbers
   Remove check pads with bandage scissors/release air bladder, unsnap/cut chin strap.

PREP PADS:
   Jersey: cut across shoulders, down front sleeves, and down the side,
   Pads: cut anterior chest pad laces / fasteners, release all straps.

REMOVAL:

Lead therapist supports head with hold of choice
   Vice-grip hold  Occiput / Submandibular  hold
   Cradle hold   Cradle the occiput with two hands (useful with heavier athletes)

   Important to ensure that jersey or straps are not caught under therapists’ arms/hands.

Assistant therapist expediently removes helmet with slight spread, cranial / gentle forward flexion movement of helmet without causing movement to head / neck.
   Therapist then reaches across pads at trap level of pads and slightly separates and pulls pads longitudinally out from under athlete.
   Have another rescuer on standby with scissors (snags).
SUMMARY

On-field responders in professional sport (eg: football) should be highly-trained and skilled rescuers. They are practiced in procedures to safely remove facemask/helmet/shoulder pads on-field in the event of an emergency.

Such emergencies include a suspected spinal injury in a player who must be safely transported off the field and transferred by ambulance to a hospital emergency room.

Such procedures are best performed in a "controlled setting" where the rescuers are able to apply (as a minimum) reasonable skill and knowledge within a safe environment (eg: weather permitting). If environment is not controlled, as a minimum the facemask must be removed (4 snubbers) and athlete immobilized/packaged and safely removed from the field.

Depending on the situation the helmet/shoulder pads are then removed either; once off the field and on sidelines, in the ambulance, or at the ER. Athlete safety is compromised at each stage where there is a delay in equipment removal.

Each therapist must evaluate their situation and provide the best care possible taking into consideration available personnel, equipment, urgency, and potential for athlete instability.
Hockey has different issues, helmets are removed sooner than later (stability issues)
MERCI