Amateur Motocross Athletes: Common Injuries

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Motocross in Southeast MN

- **7 motocross tracks in our region**
- **Growing popularity of the sport**

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SpringCreek Millville, MN

Lucas Oil Pro Motocross Championship

SpringCreek Millville, MN

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Millville Motocross Season

- 1827 riders
- Age: 4- 60+ yrs
- Outdoor Season: April –Oct

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Motocross Morbidity: Economic Cost and Injury Distribution in Children

A. Noelle Larson, MD, Anthony A. Stans, MD, William J. Shaughnessy, MD, Mark B. Dekutoski, MD, Michael J. Quinn, RN, CRNA, and Amy L. McIntosh, MD

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- **2000—2007 aged < 18 yrs**
- **Ave age: 14. 1**
- **299 injuries in 249 patients**
- **50 % required hospital admission**
- **1/3 required a surgical procedure**
  - **90% orthopedic**
- **20% multiple injury episodes (2-4 presentations)**

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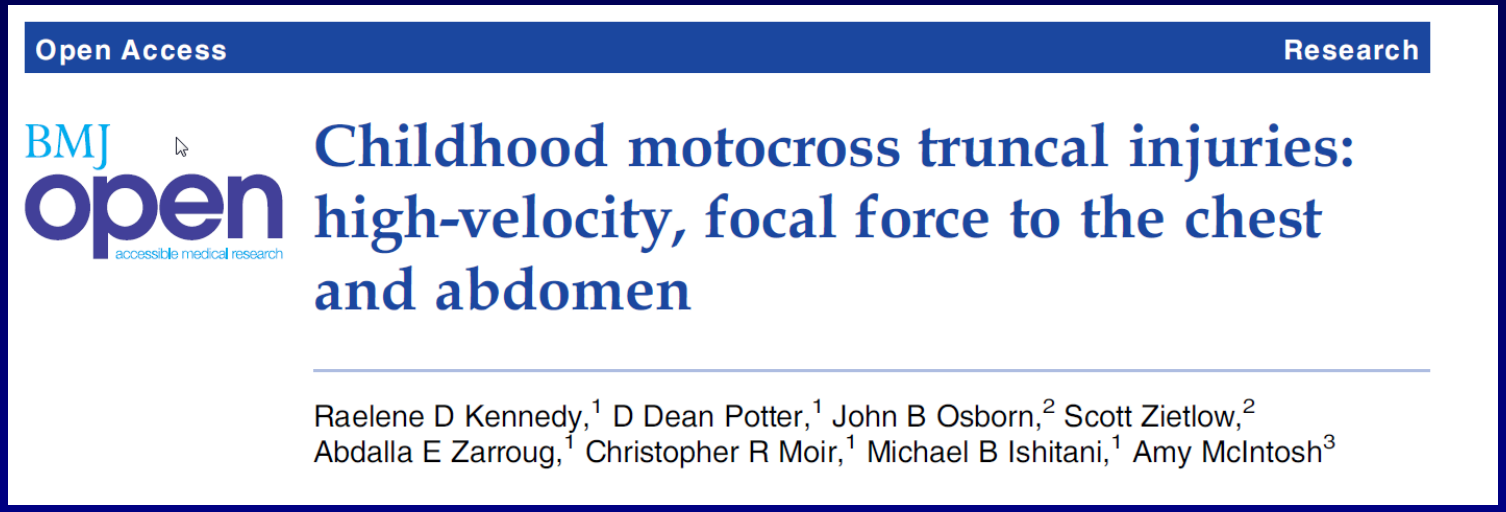
TABLE 1. Orthopedic Injuries

Fractures	Number	Operative Treatment
Hand	16	3
Forearm	46	7
Elbow	4	3
Clavicle	30	1
Humerus	14	6
Scapula	4	0
Sternum	1	0
Spine	13	5
Pelvis	7	1
Foot	14	4
Ankle	8	3
Pilon	1	1
Tibial shaft	23	9
Tibial plateau	4	3
Tibial spine	3	2
Femoral shaft	24	24
Distal femur	5	5
Dislocations		
Hip	3	0
Shoulder	7	0
Sternoclavicular	1	0
Thumb	1	1
Miscellaneous		
Traumatic arthrotomy	1	1
Lacerations	15	5
Contusions	24	0
Sprains	6	0
Cervical spine strain	8	0
Slipped capital femoral epiphysis	1	1

Truncal Injuries



Open Access Research

BMJ open accessible medical research

Childhood motocross truncal injuries: high-velocity, focal force to the chest and abdomen

Raelene D Kennedy,[1] D Dean Potter,[1] John B Osborn,[2] Scott Zietlow,[2] Abdalla E Zarroug,[1] Christopher R Moir,[1] Michael B Ishitani,[1] Amy McIntosh[3]

- 30 patients (19%) thoracic and abdominal injuries
- ICU admission 50%
- Average hospital stay 4 days
- 30% required operative intervention

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Common Truncal Injuries

Table 1 Description of injuries

Injury description	Number of patients (n)	%
Thorax	14	47
Pneumothorax	10	33
Lung contusion	9	27
Rib fracture	5	17
Vertebral fracture	3	10
Clavicle fracture	2	7
Sternum fracture	1	3
Abdomen	18	60
Spleen laceration	8	23
Liver laceration	4	13
Penetrating wound to abdominal wall	2	7
Retroperitoneal hematoma	2	7
Kidney laceration	1	3
Small bowel injury	1	3
Multiple injuries	11	37
Multiple thoracic injuries	9	30
Multiple abdominal injuries	0	0
Thoracic and abdominal injuries	2	7

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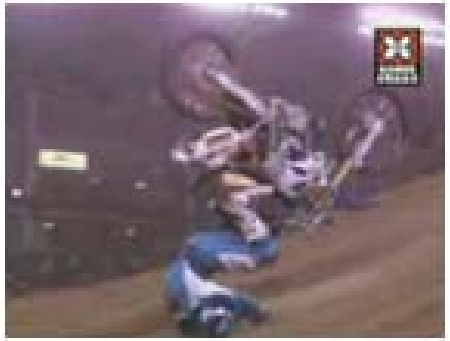
Orthopedic Injuries

Injury	Number	Operative Tx
Hand	16	3
Forearm	46	7
Elbow	4	3
Clavicle	30	1
Humerus	14	6
Scapula	4	0
Sternum	1	0
Spine	13	5
Pelvis	7	1
Foot	14	4
Ankle	8	3
Pilon	1	1
Tibial	30	14
Femoral Shaft	24	24
Distal Femur	5	5
Dislocations	12	1

Spine Injuries

- Spine Fractures: 13 patients (4.3 %),
  5 requiring surgical fixation
  - Thoracic or Lumbar Compression fractures
  - TP Fractures
- Cervical Strain: 9 patients (3.0 %)
- Spinal Cord Injury: 1 patient →
  T5 compression fx with disc-retropulsion

This can't be good for your spine!



Motocross Study ** Part Two
Degenerative Spine Changes

- Study Design: Retrospective case-control study
- Cases = Children < 18 years old treated for motorbike injury at our facility between 2000 – 2007 with Spine X-rays or CT scans
- Controls = Children (< 18) with Spine X-rays or CT scans for any other reason

Methods

- CT scans with sagittal and coronal reconstructions or high quality X-rays
- Films reviewed by two neurosurgeons and a radiologist
- Degenerative changes quantified ***
  - Endplate Abnormalities
  - Disk Abnormalities
  - Loss of Height-Vertebral Body
  - Vertebral Body Wedging
  - Malalignment
  - Osteophytes

*** Acute pathologic segments were excluded

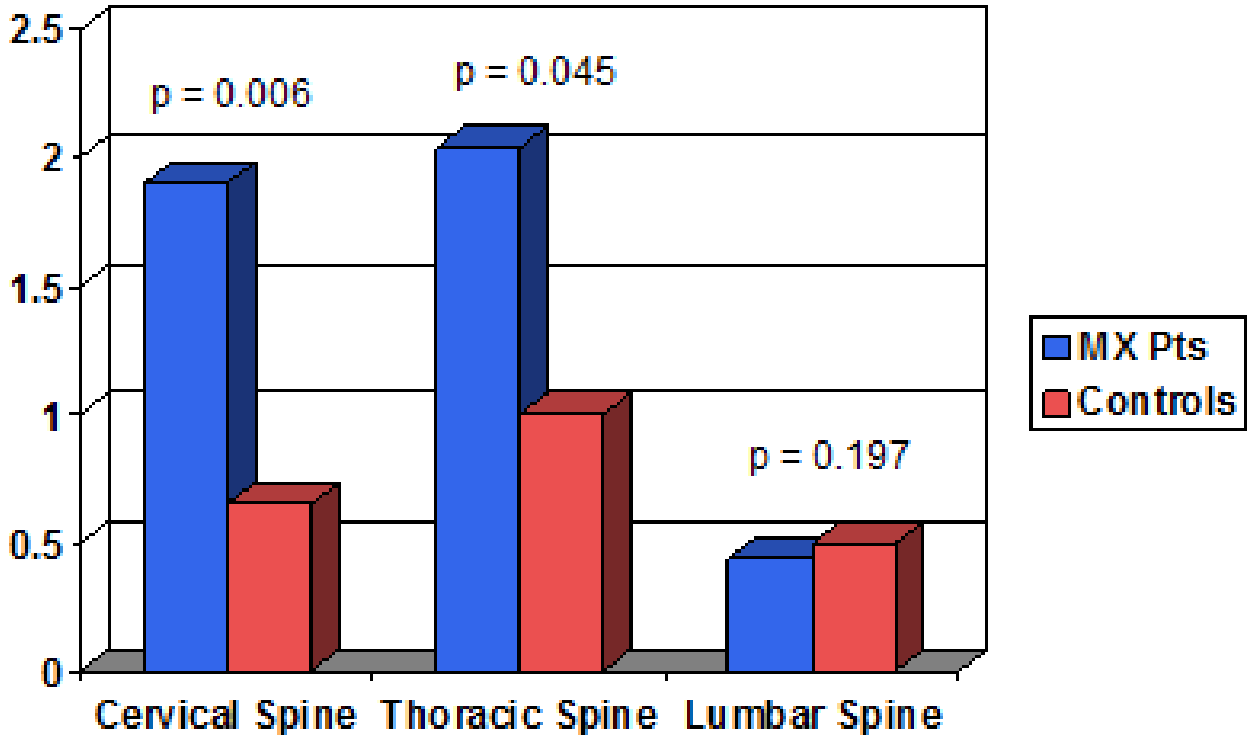
12 Year-Old Female

16 Year-Old Male

Demographics

	MX Cohort	Controls
n	29	45
Age (S.D.)	14.7 (2.0)	14.3 (1.4)
Male (%)	24 (83 %)	32 (71 %)
C-spine films	29	31
fractures	0	4
T-spine films	25	25
fractures	8	1
L-spine films	25	30
fractures	2	0

Mean Degenerative Changes Per Patient

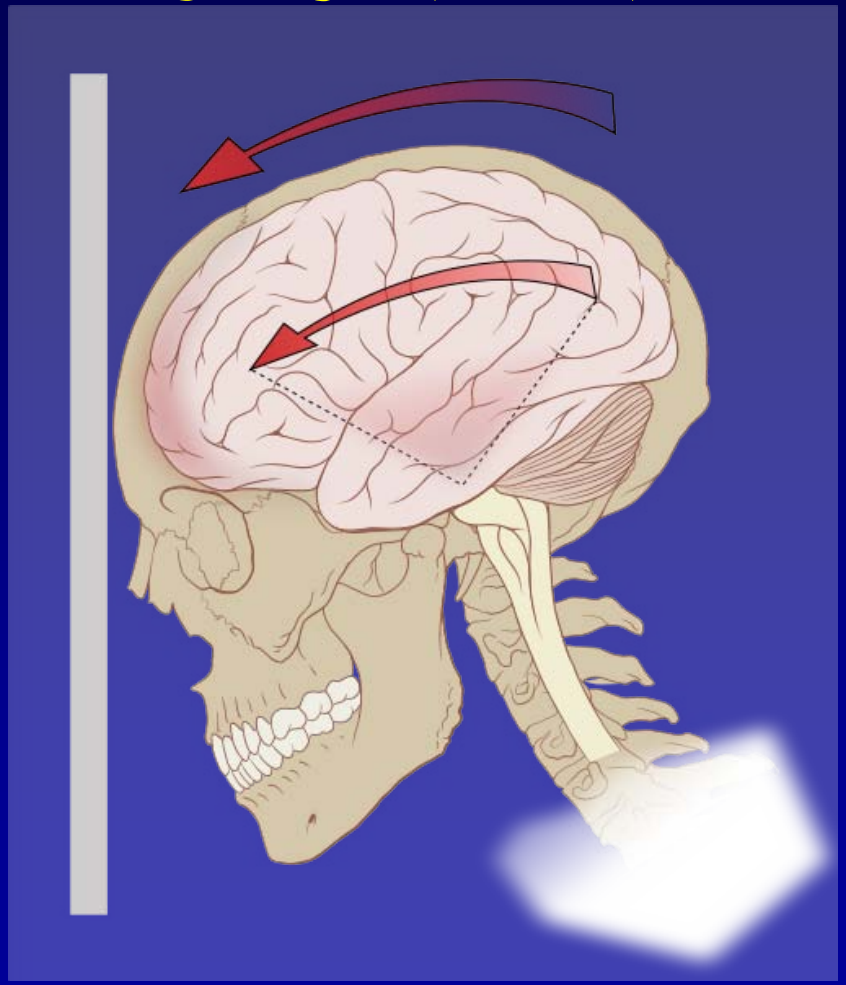


Conclusions

- Increased Degenerative Abnormalities in Cervical and Thoracic Spines of Pediatric Motocross Racers compared to Controls
- Etiology Unknown
  - Repetitive Microtrauma?
  - Macrotrauma?
- Long-Term Consequences Unknown
- Parents and Racers need to be counseled

Traumatic Brain Injury (TBI)

- **57 cases (20%): LOC**
- **40 admitted to hospital for head injury**
- **71% helmet use**



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Imaging

- 10 patients → abnormal CT
  - Skull fracture
  - Epidural
  - Subdural
  - Subarachnoid
  - Intraparenchymal
- 4 patients → neurologic deficits

Concussion & Motocross

- **20% → LOC**
- **LOC → most severe form of a concussion**
- **No concussion data in motocross**

2010 Outdoor season

- **May – Oct 2010**
- **139 riders : < 18 yrs (ave: 12.2 yrs)**
- **91% male, 9 % female**
- **Surveyed at start, mid, & end of season**

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RESULTS

- **50% concussion symptoms**
- **Only 40% obtained a medical exam for symptoms**
- **30% continued racing the same day as symptoms**

Concussion Symptoms

• Headache	31%
• Feeling Sluggish/ hazy	24%
• Dizziness/ balance problem	24%
• Confusion	20%
• Photophobia	15%
• Blurry vision	15%
• Nausea/ vomiting	14%

Risks for concussion

- Sponsor support: RR 1.48 (p: .0244)
- Aggressive riding: RR 1.79 (p: .015)
- Help fitting helmet ↓ concussion risk by 41%.
  - RR: 0.59 (p: .0032)

Problems

- Diverse patient population (ND, SD, MN, NE, WI, OH, MI)
- Not a scholastic sport
- NO athletic trainers
- NO team physicians
- NO follow-up

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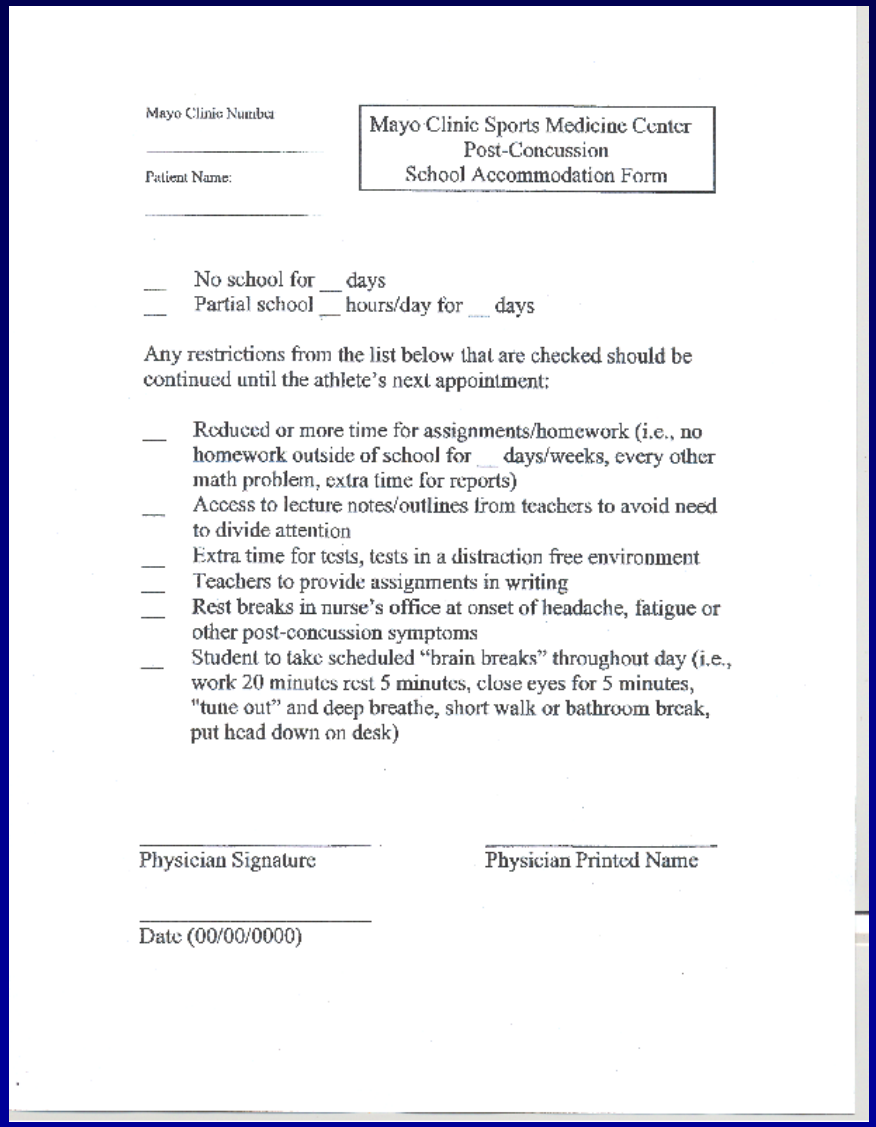
Mayo Clinic Sports Medicine Concussion Program

- See ATC
- See MD/DO
- No sport participation until cleared by physician
- If symptoms persist past 2 weeks
- Referral to Complex Brain team

School Form



Mayo Clinic Number

Patient Name:

Mayo Clinic Sports Medicine Center
Post-Concussion
School Accommodation Form

__ No school for __ days
__ Partial school __ hours/day for __ days

Any restrictions from the list below that are checked should be continued until the athlete's next appointment:

__ Reduced or more time for assignments/homework (i.e., no homework outside of school for __ days/weeks, every other math problem, extra time for reports)
__ Access to lecture notes/outlines from teachers to avoid need to divide attention
__ Extra time for tests, tests in a distraction free environment
__ Teachers to provide assignments in writing
__ Rest breaks in nurse's office at onset of headache, fatigue or other post-concussion symptoms
__ Student to take scheduled "brain breaks" throughout day (i.e., work 20 minutes rest 5 minutes, close eyes for 5 minutes, "tune out" and deep breathe, short walk or bathroom break, put head down on desk)

Physician Signature

Physician Printed Name

Date (00/00/0000)

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Return to Ride Program

1. **No activity** →**Complete physical & cognitive rest (**no video games, texting)
2. **Light aerobic** →**Walking, bike up to 70% max HR**
3. **Sport Specific** → **Motocross specific exercises**
4. **Noncontact** → **Ride on flats & corners only**
5. **Full Contact** → **Ride full course**
6. **Return to Play** → **Ride in competitive race**

Motocross Specific Exercises

Soccer Ball Squats

How to do it		Exercise Progression		Modifications
1. Put the soccer ball between your legs just above your knees. Squeeze your inner thigh muscles to keep it in place.		**Phase One:** -one set		*Less challenge*: -Do squats without the ball first.
2. Hold your arms out straight in front of you		**Phase Two:** -two sets		*More challenge:* -stand on a more unstable surface (foam pad, Bosu)
3. Keep squeezing the soccer ball between your legs. Squat down almost to the level of sitting on a chair. Return to your starting position.		**Phase Three:** -unstable surface -(firm pillow or towels)		**Reminders:** *** Put your weight down through your heels.**
4. Repeat 10 times.		**Phase Four:** *Eyes closed* *(on unstable surface)*		*** Make sure your knees don't go past your toes as you squat down.**

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TBI/ Motocross 2013

- Baseline Neuropysch testing
- Every Lucas Oil Pro Motocross Racing Championship
- Dr. Reiman to present that data.

Thank You

Contact Info

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