



1



2



3



4

Statistics:

- 1.5 million / yr. 4 during this lecture. (San Diego Spinal Research Institute)
- Out of all PI case 50% have long term problems and 10% are disabled. (Dr. Croft-SDSRI)

- Nationally, Motor vehicle crashes are the *leading cause of death* for teenagers.

<http://www.nhtsa.dot.gov/people/injury/>

© Dr. R. Jay Shetlin

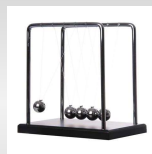
EU, 1

5

Anatomy of an accident

Crash test s99-3

Subject: MC
Vc: 9.9 mph
delta V: 6.0 mph
Head acceleration: 13.0 g
Impact vector: rear



© Dr. R. Jay Shetlin

Video

6

Anatomy of an accident

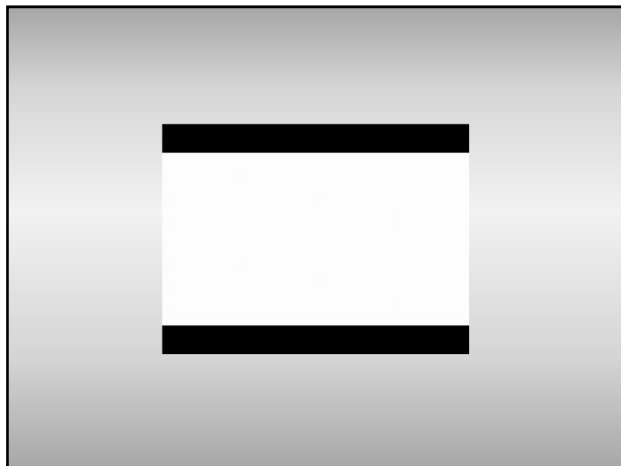
Crash test s99-3

Subject: MC
Vc: 9.9 mph
delta V: 6.0 mph
Head acceleration: 13.0 g
Impact vector: rear



© Dr. R. Jay Shetlin

7

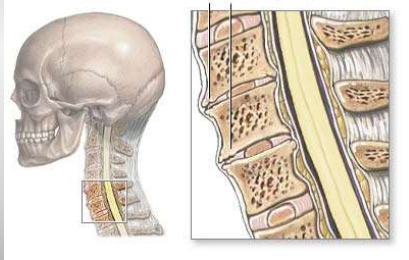


8



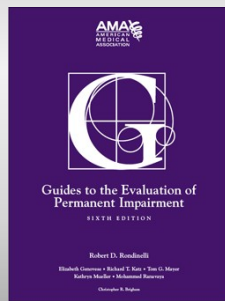
9

These Injuries Cause Joint Instability and Lead to Degenerative Changes

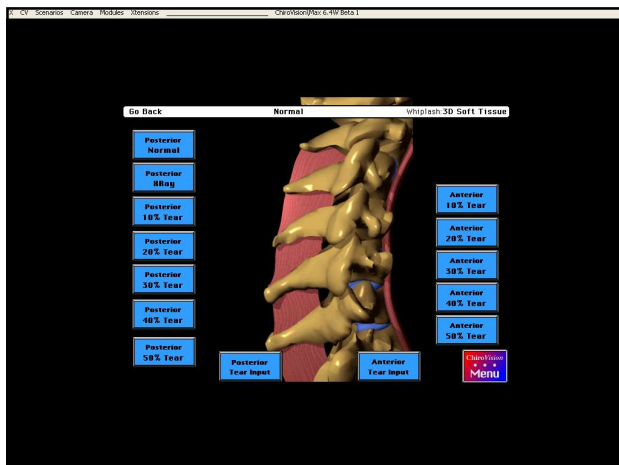


10

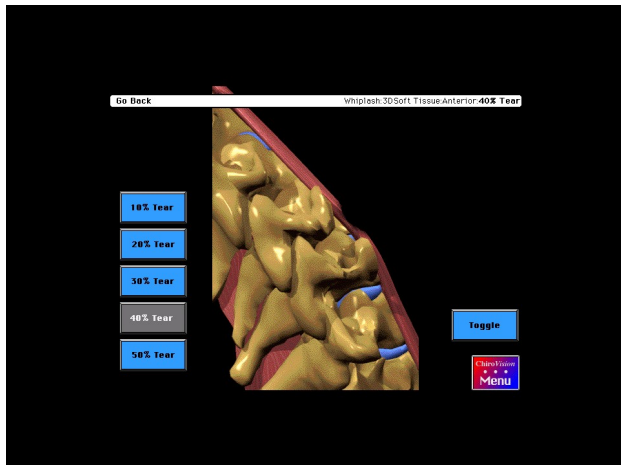
According to AMA Guides, These Injuries Are Permanent



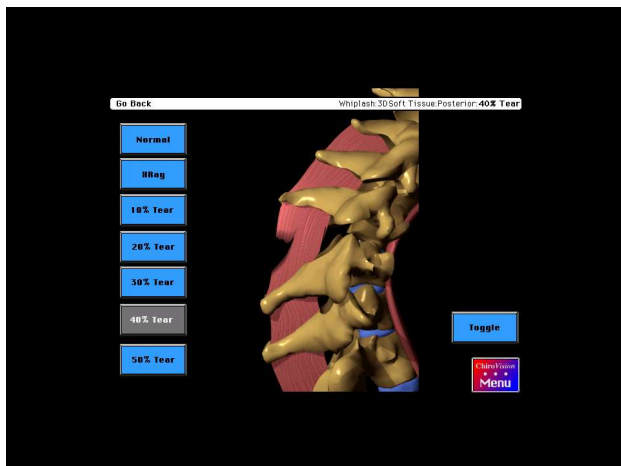
11



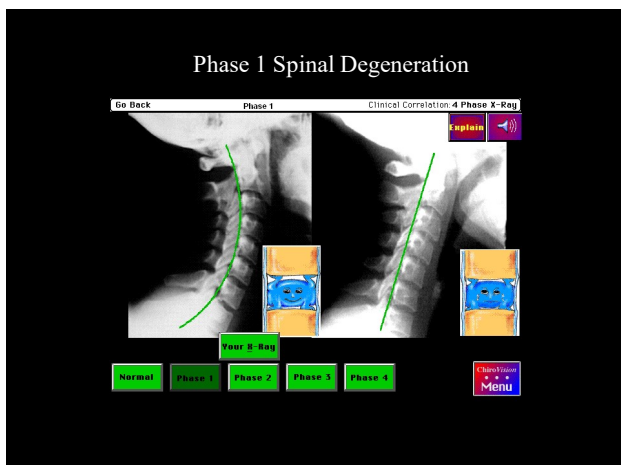
12



13

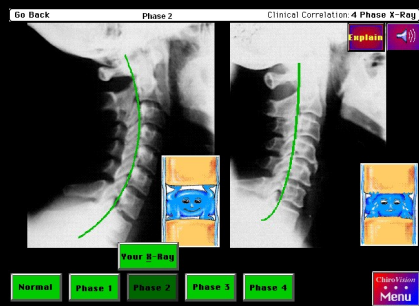


14



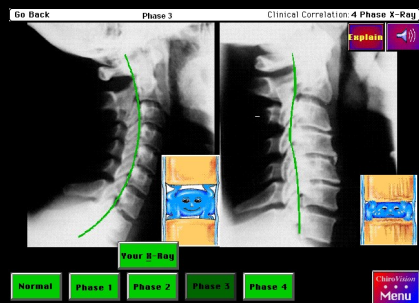
15

Phase 2 Spinal Degeneration



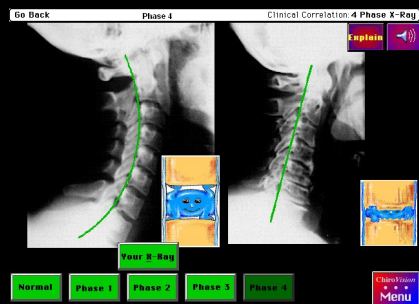
16

Phase 3 Spinal Degeneration

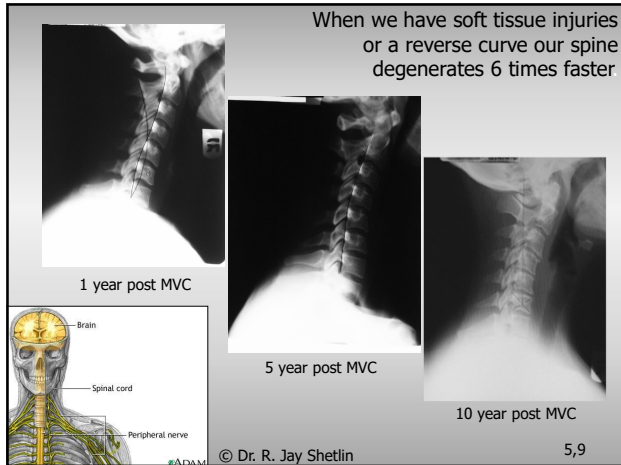


17

Phase 4 Spinal Degeneration



18



19



20

Adult Research

Researchers used six cadaver spines in their tests. Each spine was set up so the head was rotated to the left, as if the head was turned. Each spine was subjected to impacts of 3.5, 5, 6.5 and 8g, which corresponds to collisions of very low speed.

Low Speed and Ligament Damage

Panjabi MM, Ivancic PC, Maak TG, et al. Multiplanar Cervical Spine Injury due to head-turned rear impact. Spine 2006; 31(4):420-429

Research shows that just 8g's will cause soft tissue injuries

At the **8g-collision speed**, the study found **injuries** in rotation, extension, and lateral bend in nearly **every region of the spine**. In rear-end collisions with the head forward, injuries are usually limited to extension; with the head turned, the injuries become much more complex.

21

Adult Research

Female drivers were three times more likely to be injured than male drivers in whiplash crashes.

A significant percentage of chronic pain reported by women could be attributed to motor vehicle collisions.

Male and Female subjects were matched, there was little difference between men and women in neck length, but there was a large difference between men and women in regard to neck circumference and width. Men's necks were about 15% larger. The 15% difference in translated into a huge difference in neck strength. Men were 31% stronger in flexion than were women.

Complicating Factors - women

Krafft M, Kullgren A, Lie A, Tingvall C. The risk of whiplash injury in the rear seat compared to the front seat in a rear impact. *Traffic Injury and Prevention* 2005;4:136-140

Freeman MD, Croft AC, Rossignol AM, Centeno CJ, Elkins WL. Chronic neck pain and whiplash: a case-control study of the relationship between acute whiplash injuries and chronic neck pain. *Pain research and Management* 2006;11(2):79-83

Vasavada AN, Danaraj J, Seigmund GP. Head and neck anthropometry, vertebral geometry and neck strength in height-matched men and women. *Journal of Biomechanics* 2007;In press.

22

Pediatric Research

"The most common cause of serious pediatric spinal trauma is motor traffic incidents."

The 0- to 4-year age group had the highest proportion of serious injuries, at 47% of the group.

"Children who sustain minor injuries and are not brought to a hospital, but rather see a general practitioner or other health-care professional and are not included in the sample." Therefore, this "data under-represents minor injuries."

Pediatric Spinal Injury Type and Severity Are Age and Mechanism Dependent. *Spine*; October 1, 2007, Vol. 32, No. 21, pp 2339-2347 Bliston, Lynne E. PhD; Brown, Julie BSc

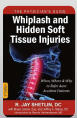


23

Pediatric Research

- "The best comparative research to Auto Accident spinal injuries for kids is comparing research to Shaken Baby Syndrome."

- Dr. R. Jay Shetlin



24

Pediatric Research

Of the total number of spinal injury cases found in this study, **30% were classified as serious** and **70% were classified as minor**.

The **mortality** can be as high as **30%**, and up to **70%** of survivors suffer **long-term impairment**.

The shaken baby syndrome (SBS) is a common form of NAHI in which the victim is held by the torso or the extremities and violently shaken, causing abrupt uncontrolled head movements with a marked rotatory component. [whiplash or CAD]

Pediatric Spinal Injury Type and Severity Are Age and Mechanism Dependent. *Spine*, October 1, 2007, Vol. 32, No. 21, pp 2339-2347 Bilston, Lynne E. PhD; Brown, Julie BSc

Review Article
Shaken Baby Syndrome
A Common Variant of Non-Accidental Head Injury in Infants Jakob Matschke, Dr. med.,*1 Bernd Herrmann, Dr. med.,2 Jan Sperhake, Dr. med.,3 Friederike Körber, Dr. med.,4 Thomas Bajajowski, Prof. Dr. med.,5 and Markus Glatzel, Prof. Dr. med.6

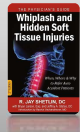
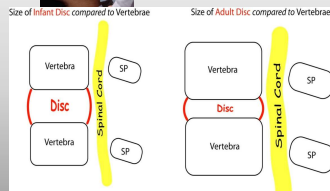


25

Pediatric Research

A number of anatomical features make infants particularly vulnerable to acceleration-deceleration events with a marked rotatory component, which typically occur on shaking [and motor vehicle collisions]. The head is large in relation to the rest of the body and is not yet adequately supported and controlled by the weak, immature neck musculature. [important]

Pediatric Spinal Injury Type and Severity Are Age and Mechanism Dependent. *Spine*, October 1, 2007, Vol. 32, No. 21, pp 2339-2347 Bilston, Lynne E. PhD; Brown, Julie BSc



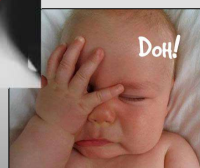
26

Pediatric Research

"**Delay or faulty treatment** leads to **adhesions about the facets** and **scarring about the capsular ligaments**, persistent spasm, congestive lymph edema, and fibrosis of muscles, swelling, and eventually adhesions of nerves within the nerve root canals."

"The resultant **faulty posture** in neglected cases enhances the **degeneration** of the intervertebral discs, as well as **spur formation** in the lateral co-vertebral articulations, which on roentgenogram (x-ray) has come to be known as **traumatic arthritis**."

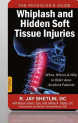
Pediatric Spinal Injury Type and Severity are Age and Mechanism Dependent. *Spine*, October 1, 2007, Vol. 32, No. 21, pp 2339-2347 Bilston, Lynne E. PhD; Brown, Julie BSc



27

Pediatric Research Summary

- Key Points by Dr. Shetlin
- According to pediatric trauma research...
- 1) "The most common accidental cause of serious pediatric spinal trauma is motor traffic incidents."
- 2) "Traffic-related incidents accounted for approximately one third of all spinal trauma and half of serious injuries."



28

Pediatric Research Summary

- 3) Spinal injuries were classified as serious if a fracture, spinal cord injury, vertebral subluxation/dislocation, or major ligamentous injury was present. Of age groups 0-16, the 0- to 4-year age group had the highest proportion of serious injuries, at 47% of the group.



29

The Effects of Vertebral Subluxation on Blood Flow to the Brain

Evan A Katz, Seana B Katz, Curtis A Fedorchuk, Douglas F Lightstone, Chris J Banach, Jessica D Podoll
braincirculation.org | Jan-Mar 2019 | Vol 5 | Issue 1 | pp 19-26

Normal Curve

Normal Cervical Curve
Healthy Blood Flow
More Volume
More Oxygen
More Nourishment

Loss of Curve

Loss of Cervical Curve
Restricted Blood Flow
Lower Volume
Low Oxygen
Less Nourishment

30

According to the review of SBS...



- 1. SBS is a non-accident version of a whiplash injury or CAD.
- 2. The Mortality and Morbidity rates are the same as MVC for the age Group 0-4 years old.
- 3. SBS has been defined as an "acceleration / deceleration" or "whiplash" injury since 1971. This is the same terminology use in MVC.
- 4. SBS and Whiplash are worse with a rotation component.



31

Pediatric Research Summary

- 5. The large head-to-body ratio combined with the immature/weak neck muscles of an infant or child make the likelihood of injury greater.
- 6. Rapid shear forces are hazardous to neck muscles, ligaments, dura matter brain tissue, spinal and intracranial blood vasculature.
- 7. Abrupt deceleration with impact increases chance of injury.
- 8. Severe or visible injuries prompt parents to have children seen by a doctor sooner.



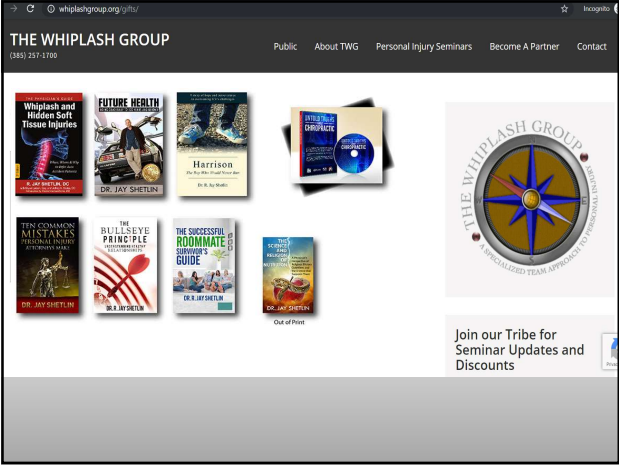
32

Pediatric Research Summary

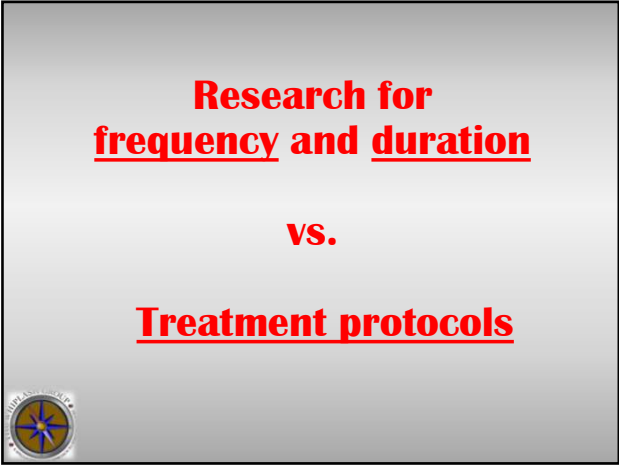
- 9. Lower brain stem injuries may not be noticeable at first but can be fatal over time.
- 10. Many soft tissue injuries go unnoticed for long periods of time leading to greater problems to deal with later.
- 11. Each child's case is individual and should be checked immediately for the welfare of the child.
- 12. Delayed or under treatment (Chiropractic) leads to early degenerative problems.



33



34



35

Research

Treatment - duration / freq.

Croft Frequency and Duration Guidelines							
Grades	Daily	3x/wk	2x/wk	1x/wk	1x/m	Total Duration	Total number of visits
I	1 wk	1-2 wks	2-3 wks	4 wks		10 wks	21
II	1 wk	4 wks	4 wks	4 wks	4 mo	29 wks	33
III	1-2 wks	10 wks	10 wks	10 wks	6 mo	56 wks	76
IV	2-3 wks	16 wks	12 wks	20 wks	**	**	**
V	Surgical stabilization necessary - Chiropractic care is post surgical						

** May require permanent monthly or permanent palliative care

36

Frequency and Duration Research for treatment of whiplash injuries

Year	Author	Duration	Frequency
1953	Billig	Several Months	3x/day then 3x/wk
1958	Seletz	N/A	Start early Daily 2-3 wks Then 3x/wk
1978	Jackson	N/A	Daily 1-2 wks Then 3x/wk
1992	Mercy Document	Uncomplicated: 16 wks Complicated: 24-32 wks	Daily for 2 wks Then 3x/wk for 4 wks Then 2x/wk for 10 wks = 16wks or 42 TX Uncomplicated program x 1.5 or 2 for complicated cases
1994	Schofferman	2mo - 2yrs Mean: 7 mo 1wk	N/A
1994	Barnsley	3mo - 2yrs	N/A
2005	Tomlinson	3mo - 2yrs	N/A



37

Treatment Protocols

- Neurologic Institute Guidelines
- Mercy Guidelines
- Quebec Task Force Guidelines
- Croft Guidelines



38

Treatment Protocols

- Neurological Institute for Neurological Disorders Guidelines

- Most commonly used by ER doctors and MD's for cases not serious enough to admit to a hospital.
- SOURCE: Doctors Specializing in Neurological disorders and Strokes...



39

Treatment Protocols

• Neurological Institute for Neurological Disorders Guidelines

Treatment for individuals with whiplash may include:

- Pain medications
- Non-steroidal anti-inflammatory drugs
- Antidepressants
- Muscle relaxants
- and on occasion, a cervical collar usually worn for 2 to 3 weeks.
- AFTER 2-3 weeks, if the patient returns...same plan repeated or...
- Range of motion exercises, physical therapy, and cervical traction may also be prescribed. Supplemental heat application may be suggested to relieve muscle tension.



ninds.nih.gov/disorders/whiplash

40

Treatment Protocols

• Mercy Guidelines

• Formed in 1993

- Developed by a 35-member commission "sponsored" by the Congress of Chiropractic State Associations
 - How were the 35 members selected?
 - Qualifications?
 - Input from other chiropractic or medical professionals?



41

Treatment Protocols

• Mercy Guidelines

- Mercy Guidelines were designed to help clinicians for treatment and expected outcome of "uncomplicated" cases
- Down side - They are useless for "Complicated" cases of which over 90% of MVC have a series of complicating factors.
- Often used by third party payers or insurance companies to reduced doctor fees or limiting treatment between 10 to 14 visits.
- When used properly they are acceptable "guidelines" in "uncomplicated" cases.



42

Treatment Protocols

- Mercy Guidelines
 - As per Dr. Dan Murphy:
 - Uncomplicated: 42 treatments over 16 weeks
 - Complicated: 63 treatments over 24 weeks
 - See notes in "Whiplash and hidden soft tissue injuries" -book




43

Treatment Protocols

- Quebec Task Force
 - This guideline applies to all accidents occurring on or after January 1, 1994, including accidents on or after November 1, 1996 and is intended to help insurers, claimants, and providers understand what is a reasonable medical and rehabilitation expense for a person who has sustained a whiplash injury.
 - Report titled *Redefining "Whiplash" and its Management* was published in the April 15, 1995 edition of Spine. The full report is available directly from the SAAQ.

Who sponsored it?

The Société d'assurance automobile du Québec (SAAQ) i.e one of the public auto insurer in the Province of Quebec.



44

Treatment Protocols

- Quebec Task Force –WAD management

Classification

Grade I	Grade II	Grade III	Grade IV
---------	----------	-----------	----------

Manage pain return to usual activities as soon as possible. TX -1 to 12 weeks.
If no improvement or minimal improvement by 6 to 12 weeks requires interdisciplinary team care.

**Considered MMI when you can work



45

Treatment Protocols

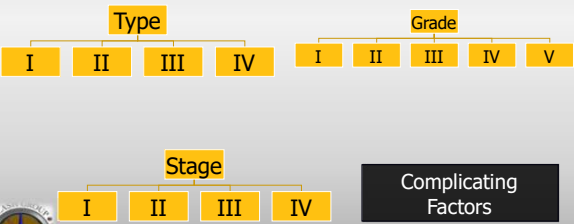
- CROFT Guidelines
 - 35 years of research based guidelines.
 - No ties to insurance or third party payers
- Readily accepted in most US states and abroad as the most current and best researched guidelines.
(37 states and 9 countries)



46

Treatment Protocols

- CROFT Guidelines



47

Research

Treatment - duration / freq.

Year	Author	Duration	Frequency
1953	Billig	Several Months	3x/day Then 3x/wk
1958	Seletz	N/A	Start Early Daily 2-3 wks Then 3x/wk
1978	Jackson	N/A	Daily 1-2 wks Then 3x/wk
1986	Amels	Mild: up to 6 months Mod: 6 months- 3 years	N/A
1992		Uncomplicated: 16 wks	Daily for 2 wks Then 3x/wk for 4 wks Then 2x/wk for 10 wks "~ 42 visits"
		Complicated: 24 - 32 wks	1.5 or 2X the uncomplicated frequency
1994	Schofferman	2 mo - 2 yr 1 mo Mean: 7 mo 1 wk	N/A
1994	Barnesley	3 mo - 2 yrs	N/A
2005	Tomlinson	3 mo - 2 yrs	N/A



48

Research

Treatment - duration / freq.

2002

Croft

Diagram of a vertebra showing the disc and surrounding structures.

Diagram of a vertebra showing the disc and surrounding structures.

Grades	Severity	Anatomical and Clinical Description
I	Minimal	No limitation of range of motion, no ligamentous injury, no neurological symptoms.
II	Slight	Limitation of range of motion, no ligamentous injury, no neurological findings
III	Moderate	Limitation of range of motion, some ligamentous injury, neurological findings present
IV	Moderate to Severe	Limitations of range of motion, ligamentous instability, neurological findings present, fracture or disc derangement
V	Severe	Requires surgical treatment and stabilization.

49

Research

Treatment - duration / freq.

Croft Frequency and Duration Guidelines							
Grades	Daily	3x/wk	2x/wk	1x/wk	1x/m	Total Duration	Total number of visits
I	1 wk	1-2 wks	2-3 wks	4 wks		10 wks	21
II	1 wk	4 wks	4 wks	4 wks	4 mo	29 wks	33
III	1-2 wks	10 wks	10 wks	10 wks	6 mo	56 wks	76
IV	2-3 wks	16 wks	12 wks	20 wks	**	**	**
V	Surgical stabilization necessary - Chiropractic care is post surgical						

** May require permanent monthly or permanent palliative care

50



Current Research

- 3 x/ week for at least 5 weeks

51

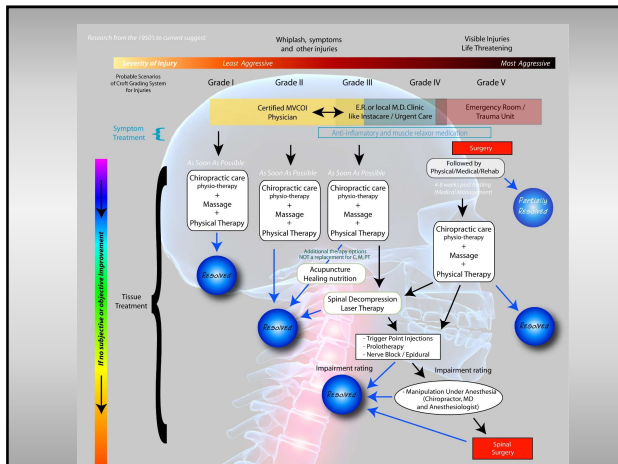
17



Current Research

- <https://cbpnonprofit.com/publications/>

52



53



“Untold Truths
About
Chiropractic”

Dr. Shetlin's Business Card



54

WhiplashGroup.org
New Members Welcome!



55
