A review of the literature refuting the concept of minor impact soft tissue injury


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This article cites 63 references.

FROM ABSTRACT:

BACKGROUND:
Minor impact soft tissue (MIST) is an insurance industry concept that seeks to identify late whiplash as a psychosocial phenomenon.

However, the medical literature in this area has not been systematically reviewed since the Quebec Task Force's review in 1995. [Actually, the Quebec Task Force on Whiplash stopped collecting studies in 1993.]

OBJECTIVE:
To review the medical literature which claims that late whiplash is an organic phenomenon causing significant disability.

METHODS: The medical literature was reviewed in a narrative format.

RESULTS: There are a significant number of studies which refute the MIST concept.

CONCLUSION: A review of the literature did not support the validity of MIST.

THESE AUTHORS ALSO NOTE:

“In the mid 1990s The United States automobile insurance industry launched a new concept in claims handling called MIST, an acronym for minor impact soft tissue.”

“The theory behind this claim stance was that it is virtually impossible to sustain permanent or serious injury in a low-damage car crash.”

“This new concept has expanded to almost all major American car insurers, yet little has been published regarding its scientific validity.”

For patients with objective physical examination findings but little automobile property damage, this policy has led to a loss of insurance coverage for their injuries. [Insurance companies are basing a patient’s injuries on the examination of the car rather than on the examination of the patient. This is absurd.]

The few studies that support MIST are flawed because they used staged crashes that were specifically designed not to injure the participants.
Real world crashes using “black-box” technology have proven that:

1) Delta Vs between 3.1 to 6.2 mph causes twice the chronic injury rate as delta Vs between 6.2 to 9.3 mph.

2) Delta Vs between 9.3 to 12.4 mph causes twice the chronic injury rate as delta Vs between 12.4 to 15.5 mph.

This paradox is likely related to the “stiffness and elasticity of the vehicle and the complex interplay between seat design, occupant mass, occupant position, and vehicle dynamics.”

Studies have shown that adding a tow-hitch to the rear of a struck vehicle increases patient injury while reducing vehicle damage, factors that the “MIST program does not take into account when determining injury risk.” [IMPORTANT]

Studies indicate that long-term disability from serious neck injury result from high-energy but low damage and low delta V collisions. [Very IMPORTANT]

Other studies have documented “objective clinical deficits” in both men and women subjects at collisions that produced a delta V of 2.48 and 4.96 mph, and that the “duration of symptoms experienced by women was significantly longer when compared to men.”

Several studies have concluded that “there was no connection between delta V and injury risk.” [VERY IMPORTANT]

One of the main reasons that MIST is flawed is because “studies presented at international congresses [on whiplash] show that vehicle stiffness has increased to reduce property damage in low-speed crashes.” [The KEY POINT]

Also, “one reason whiplash injuries are increasing is that seats have been made stiffer to avoid rearward occupant ejections [a by product of making vehicles stiffer]. As seats are made stiffer, the shear forces (neck injury criterion) on the neck increase.” [A KEY POINT]

“The lack of a direct link between delta V and long-term neck injury rates calls into question the validity of a no damage, no injury policy.”[Very Important]

Studies prove that MIST injuries are not confined only to muscles that resolve on their own, but involve other soft tissue structures as well. Other proven injuries include “bleeding into the dorsal root ganglion, small fractures of the facet joints, bleeding into the facet joints and other injuries.” “While these insults could be easily detected on dissection, they could not be detected on advanced imaging.” [Another KEY POINT]
Simulated low-speed, rear-end collisions have demonstrated injury to the facet joints, significant ligament stretch injury to the anterior longitudinal ligament and fact joint capsules.

“Significant joint and ligament injuries occur at low speeds.” [Important] “These findings have been confirmed in live volunteers in simulated low-speed crash tests.” [Very Important]

Numerous studies have confirmed that when the facet joints are anesthetized, pain relief results, and that approximately “50% of patients with late-whiplash were found with injured [facet] joints.”

Recently, studies have focused on central sensitization to be the cause of late-whiplash. Numerous researchers note that “late-whiplash patients have different sensory thresholds than normal controls,” indicating that these patients “feel things differently” than normal people. [Important]

Also, recent investigations have shown that “serious ligament injury is likely one cause of late-whiplash injury.” “Magnetic resonance imaging indications of upper cervical ligament injuries in the alar, transverse ligament, posterior atlanto-occipital membrane and tectorial membranes have been found in late-whiplash patients but not in controls.” “Significant lower cervical ligament injury has also been reported by multiple authors both in real-world imaging studies and in vitro cadaver studies.”

These authors conclude “late-whiplash is more than a muscle pull or mild sprain.”

In a large epidemiological study of hundreds of patients following rear-end crashes compared to thousands of controls, 7 years later there was a “160% to 370% increased risk for headache, thoracic and low back pain, fatigue, sleep disturbances and ill health for those who were in a rear-end crash.”

A similar investigation found a “3-fold increase in the risk for neck and shoulder pain 7 years after rear-end crash exposure.”

A study that followed whiplash injured patients for 15.5 years found that 70% of patients continued to report symptoms related to the original crash.

Another study of patients 17 years after whiplash injury reported that 30-35% were disabled, while only 6% of the control group were disabled.

“The vast majority of work published in the last 10 years would not support MIST.” [Very Important]
“Assuming that an insurer must take the position that the policyholder must at all times be given the benefit of the doubt, the MIST program does not have overwhelming scientific support.” [Very Important]

“It is time to retire MIST in favour of a research-based severity index approach that allows insurers to better allocate resources.” [Very Important]

KEY POINTS FROM DAN MURPHY

1) Minor impact soft tissue (MIST) is an insurance industry concept that seeks to identify late whiplash as a psychosocial phenomenon rather than an organic injury.

2) There are a significant number of studies that refute the MIST concept, and a review of the literature does not support the validity of MIST.

3) US automobile insurance companies launched the MIST concept in the mid 1990s.

4) The MIST theory claimed that it is virtually impossible to sustain permanent or serious injury in a low-damage car crash, yet it is supported by only a few flawed studies, because they used staged crashes that were specifically designed not to injure the participants.

5) [Insurance companies are basing a patient’s injuries on the examination of the car rather than on the examination of the patient. This is absurd.]

6) Well-done studies show that lower delta Vs increase the chronic injury rate by a factor of between 2 to 4 times.

7) Stiffer vehicles (with a tow-hitch on the rear) when struck, increase patient injury while reducing vehicle damage. MIST programs do not take this into account when determining injury risk. [IMPORTANT]

8) Well-done studies have documented “objective clinical deficits” in both men and women subjects at collisions that produced a delta V as low as 2.5 mph. [Wow]

9) The duration of symptoms in women is significantly longer than in men.

10) There is no connection between delta V and injury. [Very Important]

11) One of the main reasons that MIST is flawed is because “studies presented at international congresses [on whiplash] show that vehicle stiffness has increased to reduce property damage in low-speed crashes.” [The KEY POINT] [Stiffer vehicles have less property damage in a collision, but move more, resulting in greater occupant injury.]
Also, whiplash injuries are increasing because seats have been made stiffer to avoid rearward occupant ejections [a byproduct of making vehicles stiffer]. As seats are made stiffer, the shear forces that injure the neck increase. [Key Point]

“The lack of a direct link between delta V and long-term neck injury rates calls into question the validity of a no damage, no injury policy.”[Very Important]

Whiplash is proven to injure the dorsal root ganglion, cause fractures of the facet joints, tear the anterior longitudinal ligament, and injure the facet capsules. These injuries cannot be detected on advanced imaging. [A Very Important Point]

Significant joint and ligament injuries occur at low speeds, and these injuries have been confirmed in live volunteers. [Very Important]

Numerous studies have proven that the facet joints are the primary source of chronic whiplash pain, and that the chronic pain is not coming from self-limiting muscle injuries.

Chronic whiplash patients have different sensory thresholds than normal controls, indicating that these patients feel pain that others do not.

Another cause of chronic whiplash injury is serious, permanent injuries to the ligaments of the upper cervical region, including the alar and transverse ligaments, the posterior atlanto-occipital membrane and tectorial membranes. These ligament injuries can be visualized with high resolution [proton density weighted] MRI.

Whiplash injured patients have a 160% to 370% increased risk for headache, thoracic and low back pain, fatigue, sleep disturbances and ill health compared to controls.

Whiplash injured patients have a 3-fold increase of neck and shoulder pain 7 years after rear-end crash exposure, compared to controls.

70% of whiplash patients report symptoms related to the original crash 15.5 years later.

30-35% of patients reported that they were disabled 17 years after whiplash injury, while only 6% of controls were disabled.

The vast majority of work published in the last 10 years does not support MIST. [Very Important]

“The MIST program does not have overwhelming scientific support.” [Very Important]