An Investigation Into Common Tandem Instructor Injuries

Instructor 'A' Thesis

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Introduction

Anyone who is thinking about becoming a Tandem Instructor (TI), or who currently conducts tandem descents can benefit from the information contained within this thesis.

The aim of this thesis is to identify injuries commonly sustained by tandem skydiving instructors. Once identified, the most common injuries will be analysed, the cause of these injuries will be investigated and then preventative measures will be examined in order to reduce risk and occurrence of such injuries. Therefore, the thesis is divided into four parts:

1. identification of commonly suffered injuries to Tandem Instructors;
2. analysis of the injuries;
3. analysis of the cause of the injuries, and
4. prevention of such injuries.

Part 2, 3 and 4 will be explored together for each particular body part identified.

By examining common injuries sustained by TIs, it is hoped that appropriate precautions and preventative measures can be taken to minimise the risk of TIs suffering personal injury whilst conducting tandem descents.

For the purpose of this thesis, injuries are classified into two categories; acute injuries and overuse injuries.

"Acute injuries include injuries such as fractures, dislocations, ligament sprains, and muscle tears. Overuse injuries include stress fractures, inflammation, muscle soreness and nerve entrapment." (*Clinical Sports Medicine* 1999, p8)

Minor traumatic injuries such as bumps, bruises and superficial abrasions will not be included in the scope of this thesis. However, such injuries are commonplace and require proper care and treatment.

In order to gather information on this topic, tandem incidents and injury reports in the Australian Parachute Federation (APF) news-sheets from 1999 until mid 2005 have been examined. In addition, a questionnaire was devised to gather more information on this topic. The questionnaire was distributed to APF tandem instructors and all APF training organisations Australia-wide mainly by email (Appendix 1). 25 completed surveys were returned. Information gathered from the news-sheets and questionnaires provided the following results:

Identification of commonly suffered injuries to Tandem Instructors

From the APF News-sheets

Analysing the APF news-sheets from 1999 until mid 2005, there were 20 reported incidents resulting in injury to the Tandem Instructor. Of these 20 incidents, the injuries sustained by the Tandem Instructor can be grouped as follows:

- 35% were coccyx and lower back injuries
- 15% were knee injuries
- 10% were ankle injuries
- 10% were fractured femur
- 10% were facial injuries
- 5% were leg and pelvis injuries
- 5% were fractured rib injuries
- 5% were head injuries
- 5% were dislocated shoulder injuries.

The causes of these injuries were determined to be:

- 60% of the injuries were caused from sink/hard landings/turbulence/strong winds
- 20% of the injuries were caused by hard openings
- 10% of the injuries were caused by the Catcher's error
- 10% of the injuries were caused by downwind landings or low turns.

From the above information, it is clear that the leg, coccyx and lower back area was the most commonly injured area of TIs, equating to 75% of all injuries. It is also clear that landing problems (including Catcher error) was the most common cause of these injuries (80%). Hard openings accounted for the remaining 20%.

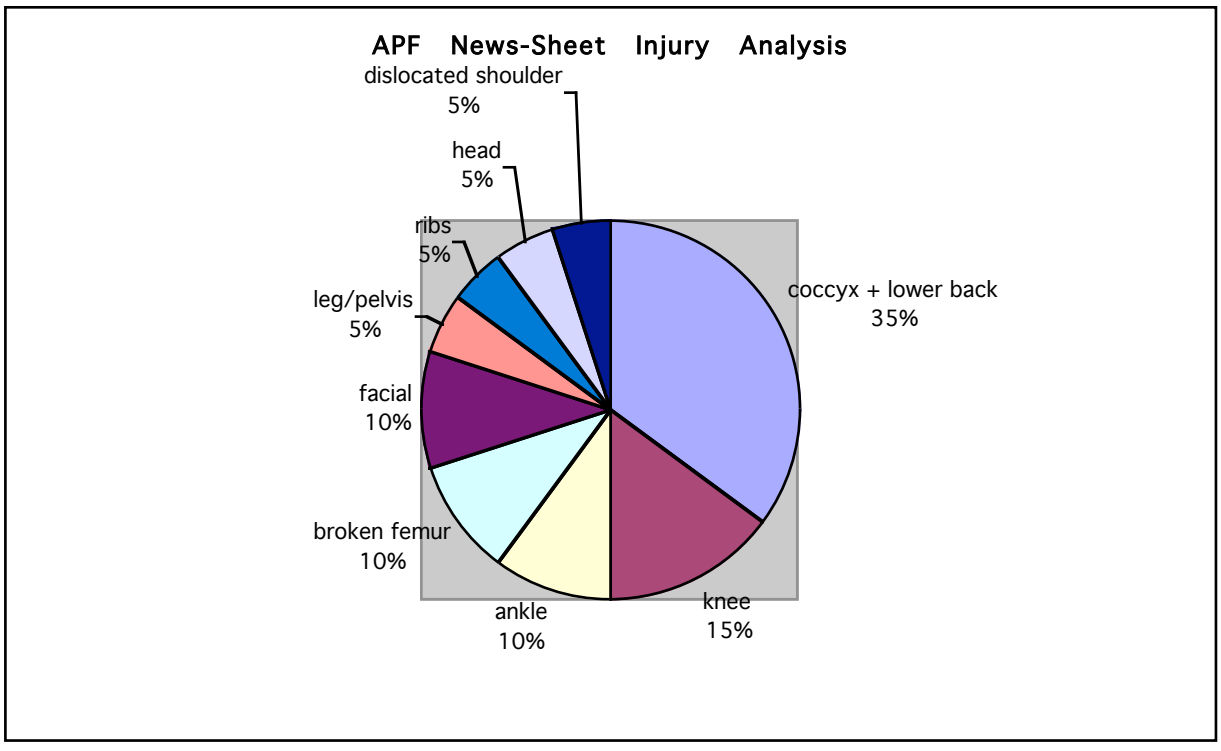

Figure 1 – APF News-Sheet Injury Analysis

From the Questionnaire

Of all the questionnaires distributed to APF Tandem Instructors and training organisations across Australia, 25 responses were handed back. Although this is not a large sample group, common trends were evident which complement the findings from the APF news-sheets. Of the 25 responses, the injuries sustained by the Tandem Instructor can be grouped as follows:

- 23% were coccyx and lower back injuries
- 23% were neck injuries
- 14.5% were knee injuries
- 10.5% were ankle injuries
- 8.5% were shoulder injuries
- 6.5% were vertebrae injuries
- 4% were leg injuries
- 2% were rib injuries
- 2% were upper back injuries
- 2% were facial injuries
- 2% were elbow injuries
- 2% were wrist injuries.

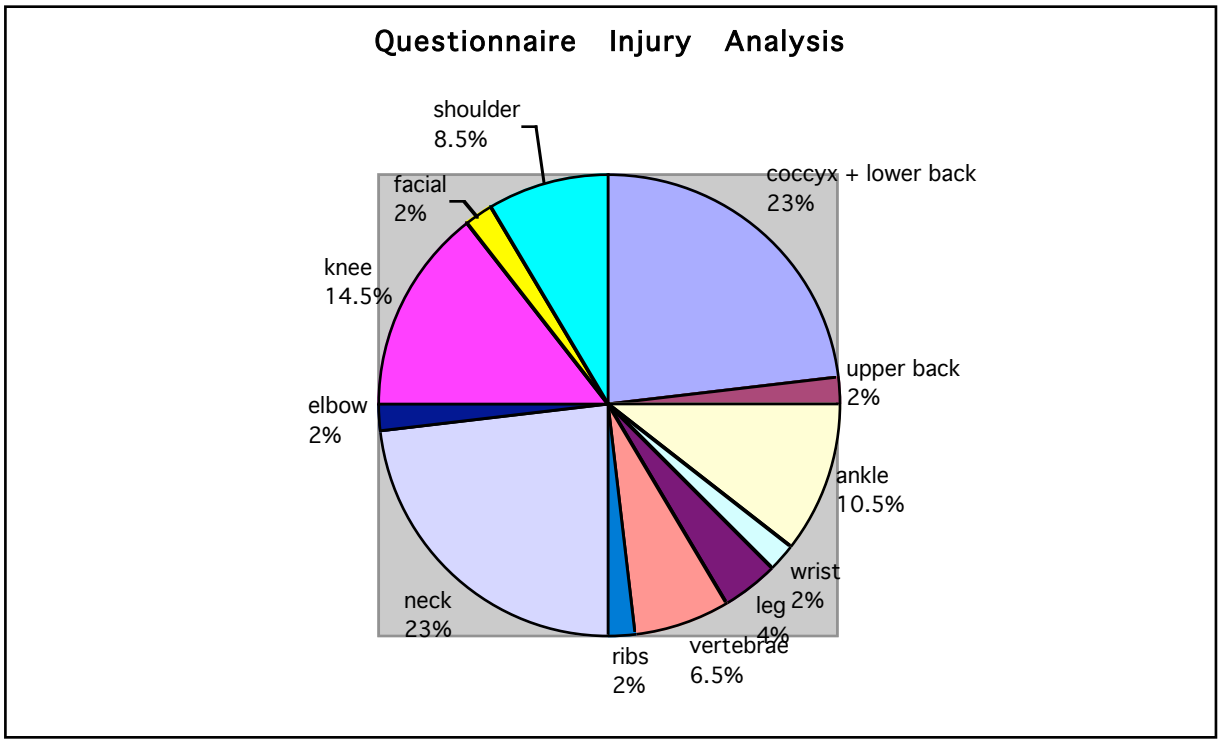

Figure 2 – Questionnaire Injury Analysis

Although not as many responses to the questionnaire were returned as was anticipated, those Tandem Instructors who did respond would be considered 'very' or 'highly' experienced with many thousands of tandem jumps and years of experience between them. This lends more weight to the findings even though the sample size was relatively small. Of the 25 respondents there are approximately 74,550-tandem jumps and 203 years experience between them, making an average of approximately 3,000 tandem jumps and 8 years experience each. Therefore it is

reasonable to say that the information gathered by this sample group is a realistic representation of the injury trends that occur within the tandem skydiving industry as a whole.

Furthermore, from the information gathered from the questionnaires, it is evident that leg, coccyx and lower back injuries are the most common of all injuries sustained by TIs. This equates to 52% of all the injuries identified and supports the findings of the APF news-sheet analysis above. The next most commonly injured area of TIs identified in the questionnaire was the neck and shoulder region (31.5%). Taking a look at the most common TI injuries, this thesis will explore a few of these areas in more detail. The areas to be covered will be the coccyx, lower back, knee, neck and shoulder.

The injuries identified so far have all been acute injuries. The APF News-sheets only report those incidents which result in acute injuries. The scope of the questionnaire was therefore expanded to include information about possible overuse injuries that may affect TIs. Overuse injuries suffered by TIs identified in the questionnaire analysis included:

- shoulder pain caused by carrying the tandem rig
- shoulder pain caused by tightening the side connectors
- sore hands from packing the parachute
- lower back pain from packing the parachute
- ankle and knee soreness from repetitive jarring on landing
- tendonitis in shoulder caused by rig soreness and subsequent protection
- general long term wear and tear on shoulders, back and knees.

Shoulders, knees and ankles have been identified as the main areas of concern in terms of overuse injuries suffered by TIs. Therefore, included in the scope of this thesis is the cause, management and prevention of possible overuse injuries to the shoulder joint.

Analysis of the Most Common Injuries Sustained by Tandem Instructors

Acute Injuries

The Coccyx

The coccyx is the last four vertebrae, fused together, at the bottom of the vertebral column below the sacrum. These bones fused together form a small triangular bone which, “except for the slight support it (the coccyx) affords the pelvic organs, is a nearly useless bone in the human body”. (*Human Anatomy and Physiology 1*992, p200). The coccyx is also referred to as the tailbone. (Figure 3 and 4)

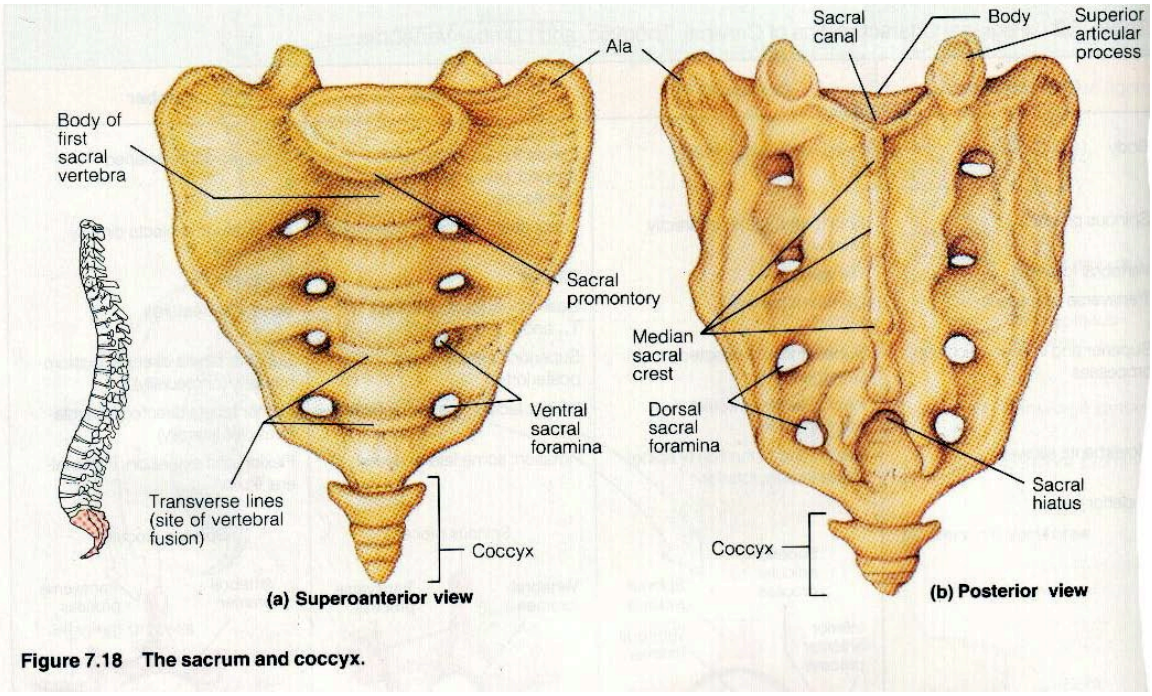

Figure 3 - The sacrum and the coccyx (*Human Anatomy and Physiology* 1992, p200)

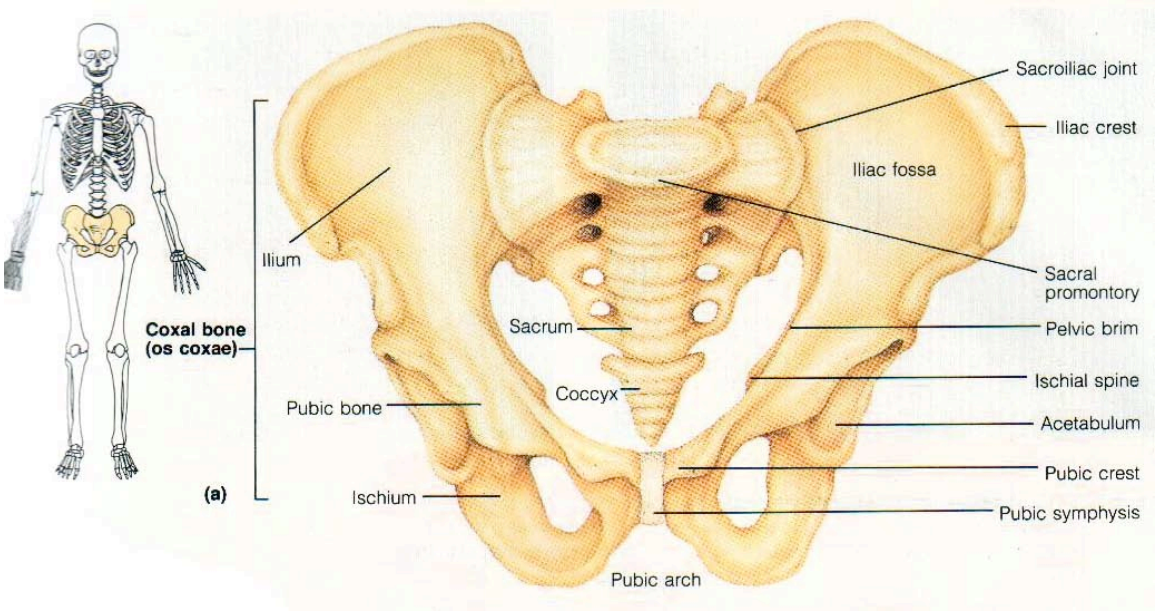

Figure 4 - Bones of the pelvic girdle (*Human Anatomy and Physiology* 1992, p 209)

Injury to the coccyx is sustained by impact to the bottom area, especially when the legs are raised in a seated position and the bottom is the first point of contact or takes the majority of the force from the impact. This can result in a "vertebral crush fracture" with the fracture located in the coccyx. *(Clinical Sports Medicine* 1999, p267)

Injury to the coccyx is relatively common amongst TIs and it is not hard to see why. Not surprisingly it is landing incidents which cause injury to the coccyx. Sink, turbulence, high winds, downwind landings, in fact any condition which results in a hard landing has the potential to cause injury, and not only to the coccyx. Catcher error which results in the tandem pair falling backwards, where the TI lands heavily on their backside with the added weight of the tandem passenger falling on top of them, has claimed more than one bruised or broken coccyx to the TI.

Anatomically speaking, landing heavily directly on your backside affords very little protection for your coccyx. Raising slightly to favour on side will offer more protection. Taking the brunt of the impact on one bottom cheek will still leave you sore and bruised but this will be muscular damage only and will heal quickly. Avoiding skeletal damage will ensure for quicker recovery time and enable the TI to keep jumping. A significant coccyx injury will keep a TI sidelined for months.

As funny as it sounds, clenching your butt cheeks really tight will help reduce the impact and possible damage to the coccyx. Once again, taking as much of the force of the impact with muscles and other stronger structures of the area such as the pelvic bone, is preferable to coccyx injury.

The best advice is to be very choosy when it comes to landing conditions. Know your landing areas and which conditions are not suitable for them. High winds, turbulence, sink, dust devils, changeable weather – anything that can result in a hard landing should be avoided not only for the care of the tandem passenger, but also for the more obvious reason, to take care of yourself. When considering to jump or not to jump in certain conditions, you have to ask yourself, is it worth it? Can it wait for better conditions or another day? Can I afford to injure either my passenger or myself? Tandem passengers put their trust in you as the professional. If you say that the conditions are not suitable, they will gladly put it off for another day. Even if they don't end up jumping at your dropzone, it is better to be safe than sorry! Not to mention the word 'negligence' and litigation concerns in the event of incidents and injuries also.

The Lower Back

For the purpose of this thesis the lower back will be classified as the lumbar vertebrae and the sacrum. (Figure 5)

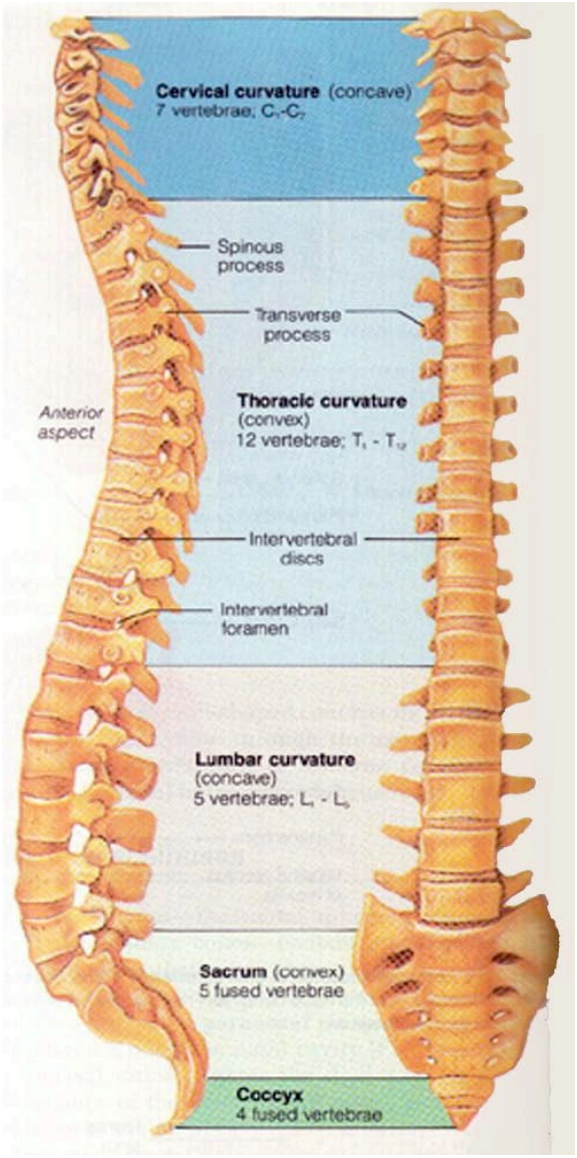

Figure 5 – The Vertebral Column (*Human Anatomy and Physiology* 1992, p194)

The most common cause of lower back injuries to TIs have been found to be the same as that for the coccyx, landings. As previously stated, conditions which resulted in a hard landing (turbulence, sink, high winds, etc.) were the reported cause of lower back injuries to TIs. In many instances, both the coccyx and lower back injuries are sustained in the same incident. Diagnosis of coccyx injury is relatively straightforward. The same cannot be said for lower back injury. "With lower back pain it is often not possible to make a precise anatomical and pathological diagnosis." (*Clinical Sports Medicine* 1999 p 265). However, "there are a small number of conditions causing low back pain in which a definitive diagnosis can be made, for example, fractures relating to direct trauma, such as transverse process fracture or compression fracture of

the vertebrae. Significant soft tissue injury is usually associated with these fractures." (*Clinical Sports Medicine* 1999 p 265). Having said that though, it is usually damage to the intervertebral discs and the apophyseal joints that are the most common causes of lower back pain. (*Clinical Sports Medicine* 1999 p 265)

Unfortunately, once injured, the lower back area can take considerable time to heal and may require preventative stretching and strengthening exercises to minimise 'niggly' type reoccurring soreness or injury. During healing a brace of some sort may be very useful to aid recovery time. (*Australian First Aid* 2002) With the lower back area being such a pivotal point of the human body it can be hard to allow enough 'rest' of the area to maximise recovery time.

Because of the relative complexity of lower back anatomy just one specific site of common injury will be analysed, an intervertebral disc. "Severe or sudden physical trauma to the spine… may result in herniation of one or more discs." (*Human Anatomy and Physiology* 1992, p195) (Figure 6)

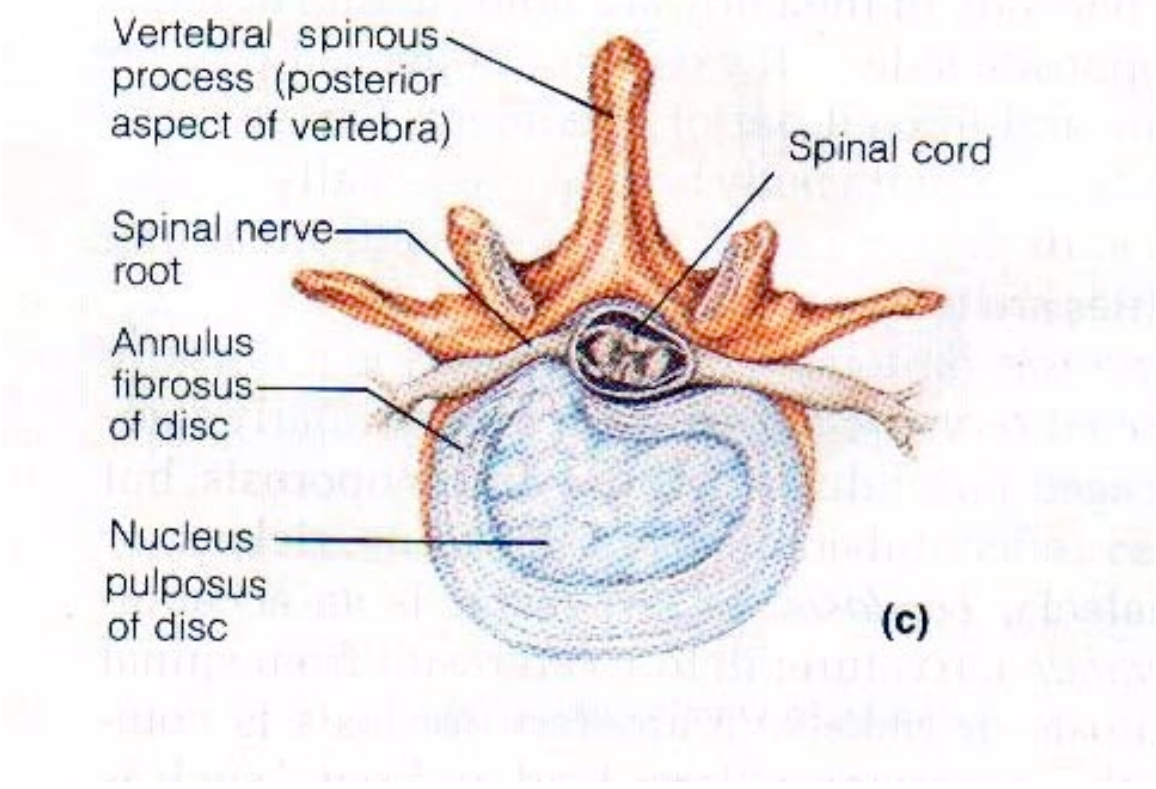

Figure 6 – Herniated or 'slipped' disc (*Human Anatomy and Physiology* 1992, p195)

A herniated or 'slipped' disc involves the rupture of the stronger outer layer (annulus fibrosus) of the disc, allowing a bulge or protrusion of the spongy inner 'nucleus pulposus' to develop. "If the protrusion presses on the spinal cord or on spinal nerves exiting the cord, numbness, excruciating pain, or even destruction of these nervous system structures may result." (*Human Anatomy and Physiology* 1992, p195)

Slipped discs are generally treated with bed rest, traction and pain killers although sometimes the protruding disc may have to be surgically removed.

"The L5-S1 disc is the most commonly prolapsed disc and the L4-L5 the next most common."(*Clinical Sports Medicine* 1999, p276) A slipped disc in this lower back region could also be the result of an overuse injury resulting from poor lifting technique. "Excessive rotational or torsional stress may damage the apophyseal joint, the annulus fibrosus or both. The annulus fibrosus is most vulnerable to a combination of axial rotation and forward flexion." (*Clinical Sports Medicine* 1999, p266) In other words, lifting in a bent and rotated position puts the most stress on your lower back intervertebral discs, which is often the motion used by many TIs to pick up their tandem rig.

Preventative measures TIs can take to avoid injury to their lower back include:

1. use proper lifting technique and the use of an aid, such as a stool or chair, when lifting and putting on the tandem rig; and
2. use correct landing technique and jump in good weather conditions. This is the same as for the coccyx. The use of a modified PLR landing roll can spread the force of a 'hard' landing and minimise the risk of injury.

The Knee

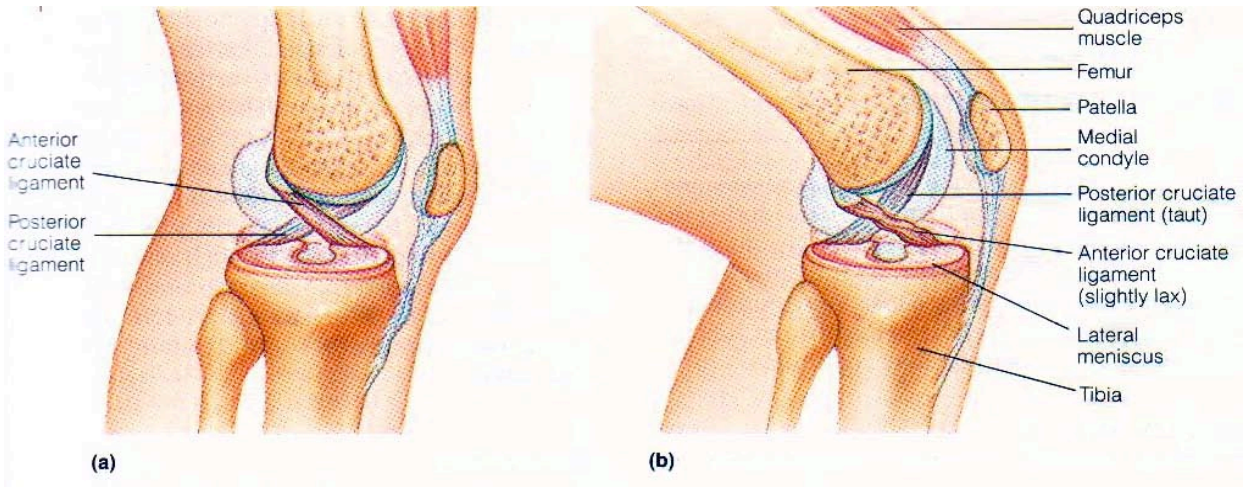

Figure 7 -Knee joint movement (*Human Anatomy and Physiology* 1992, p239)

"The knee joint is the largest and most complex joint in the human body." (*Human Anatomy and Physiology* 1992, p237). (Figure 7)

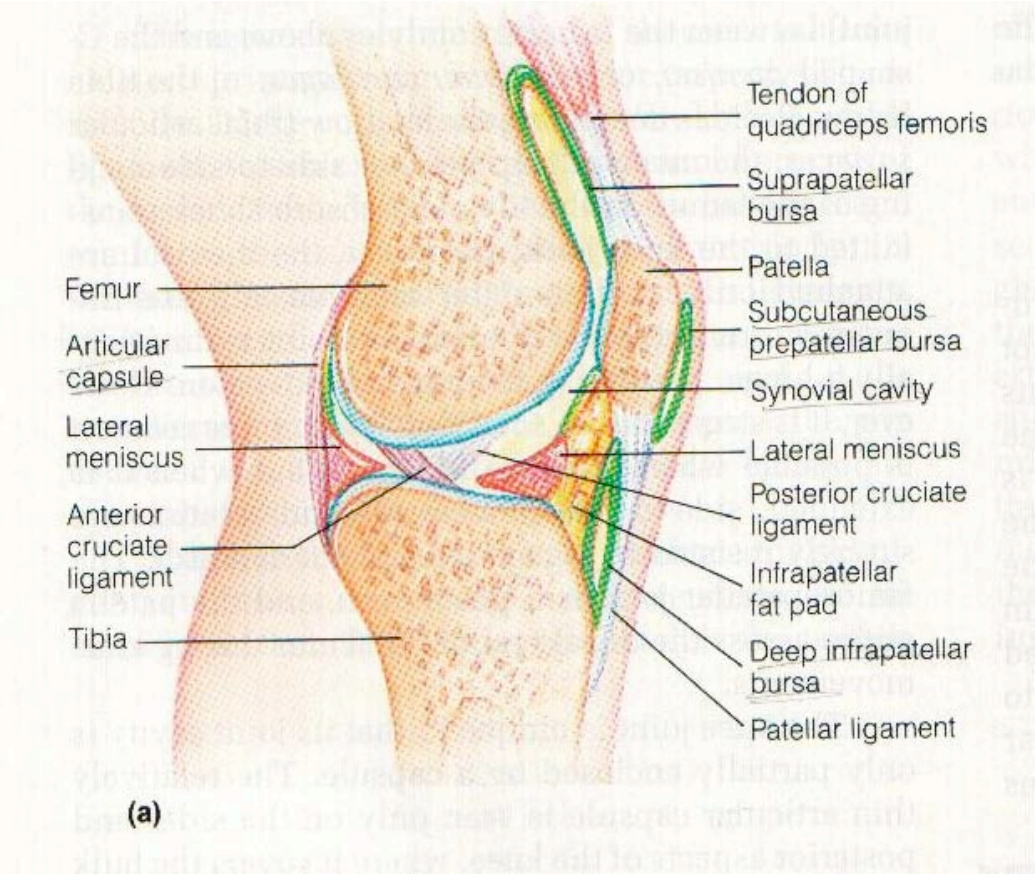

Figure 8 – Knee joint relationships (*Human Anatomy and Physiology* 1992, p238)

Due to its weight-bearing role in the human body, the knee relies heavily on muscles, tendons and ligaments for stability. Commonly, when the knee is injured, it is a tear or rupture of one or more of these ligaments. (Figure 8)

The cause of TIs injuring their knees was found on examination almost always to occur on landing. The impact of a hard landing that causes coccyx and/or lower back injury can also result in knee injury. However, knees are susceptible to injury on just about any landing in any conditions. Bad landing technique can result in knee injury even on the calmest of days. For example, landing a tandem with one leg stuck straight out and the knee locked, which has the combined weight of the tandem passenger and the TI going through the one knee joint. This combined force will overload the knee joint causing it to buckle and give way, resulting in injury. Any twisting or rotational forces going through the knee (eg. falling over sideways after landing) can easily rupture or tear ligaments. "The knee can absorb a vertical force equal to nearly seven times body weight. However, it is very vulnerable to horizontal blows and rotational movements." (*Human Anatomy and Physiology* 1992, p239).

To analyse all of the different structures in the knee would take considerable time. Therefore, for the purpose of this thesis, analysis of the anterior cruciate ligament (ACL) only will be conducted. (Figure 9)

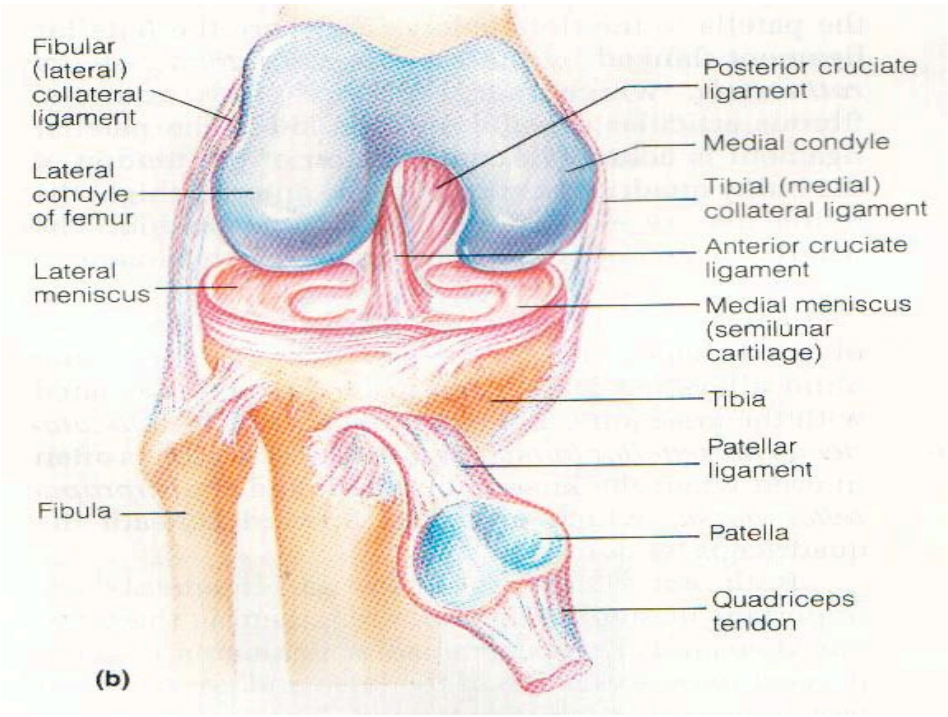

Figure 9 – Knee joint relationships (*Human Anatomy and Physiology* 1992, p238)

"Most ACL tears occur when the athlete is landing from a jump, pivoting or decelerating suddenly." (*Clinical Sports Medicine* 1999, p355). Sound familiar? No wonder this type of injury is of concern to TIs.

As can be seen from the location of the ACL within the knee joint itself (Figure 9), it is essential for control in pivoting movements, to prevent forward movement of the tibia in relation to the femur and to control rotational movement. Without an intact ACL, subluxation of the tibia may occur when an activity such as landing from a jump is attempted. (*Clinical Sports Medicine* 1999, p337). This is why one of the most common knee injuries is a torn or ruptured ACL. It is also why the two cruciate ('cross') ligaments, anterior and posterior, are often referred to as the 'crucial' ligaments, such is their importance in sporting activity. (*Clinical Sports Medicine* 1999, p237).

Once a torn ACL has been diagnosed it usually means one thing, knee reconstruction surgery. Following this is a "comprehensive, time-consuming rehabilitation program after surgery." (*Clinical Sports Medicine* 1999, p353). Recovery from ACL reconstruction surgery is estimated at six months, however it can take much longer. It makes sense then that ACL tears are the most common cause of prolonged absence from sport in general. (*Clinical Sports Medicine* 1999, p353).

There are a number of preventative measures TIs can take to avoid injury to the knee joint. Firstly, and most importantly, avoid bad landing conditions. Secondly, use good landing technique. Spreading the load evenly through both legs and having the legs slightly bent to help absorb landing forces will help to reduce the risk of overloading one knee joint. Avoid any sideways motion when landing. Avoid pivoting, rotating or twisting movements when landing as this is what the knee joint, and especially the ACL, are most vulnerable to. If you are concerned about your knees or have previously injured your knees, a combination of bracing and taping is a

good idea. This will add strength and stability to the knee joint in its weaker areas. It will also help you to be aware of your knees when it comes to landing time.

The Neck

The bones of the neck are the seven cervical vertebrae, C1 to C7. The first two cervical vertebrae, the atlas and the axis, are highly modified, and this reflects their special functions. The skull rests on the atlas, C1, and allows for the movement of nodding 'yes'. The axis, C2, acts as a pivot for the rotation of the atlas, allowing your head to rotate from side to side and indicate 'no'. (*Human Anatomy and Physiology* 1992, p198) (Figure 10 and 11)

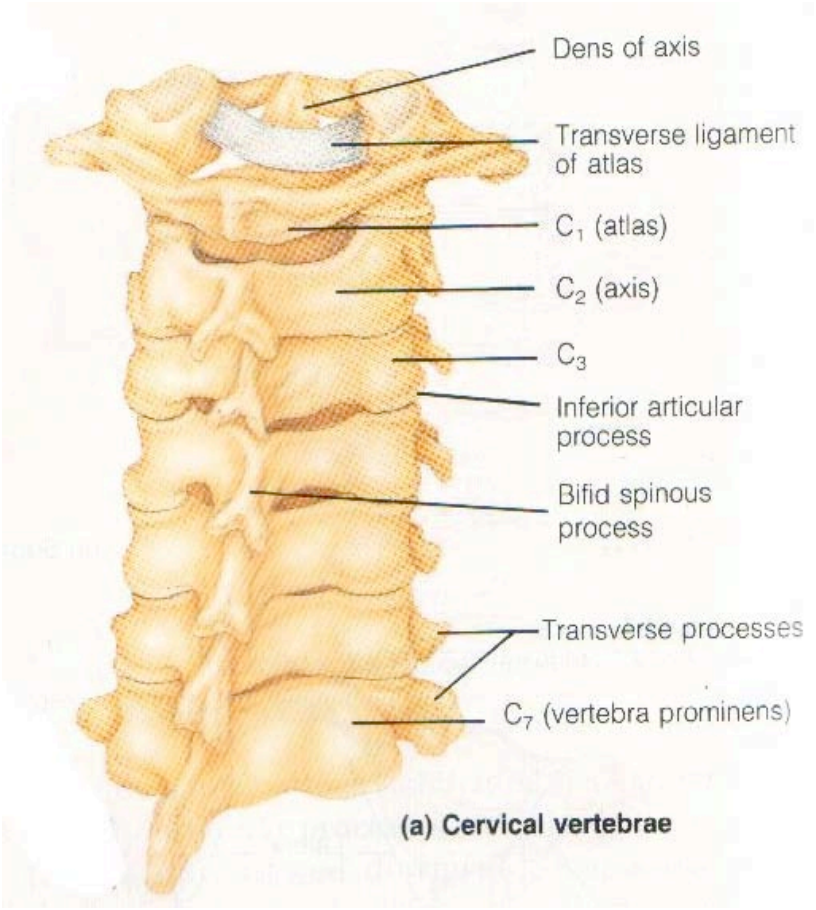

Figure 10 - Cervical vertebrae (*Human Anatomy and Physiology* 1992, p198)

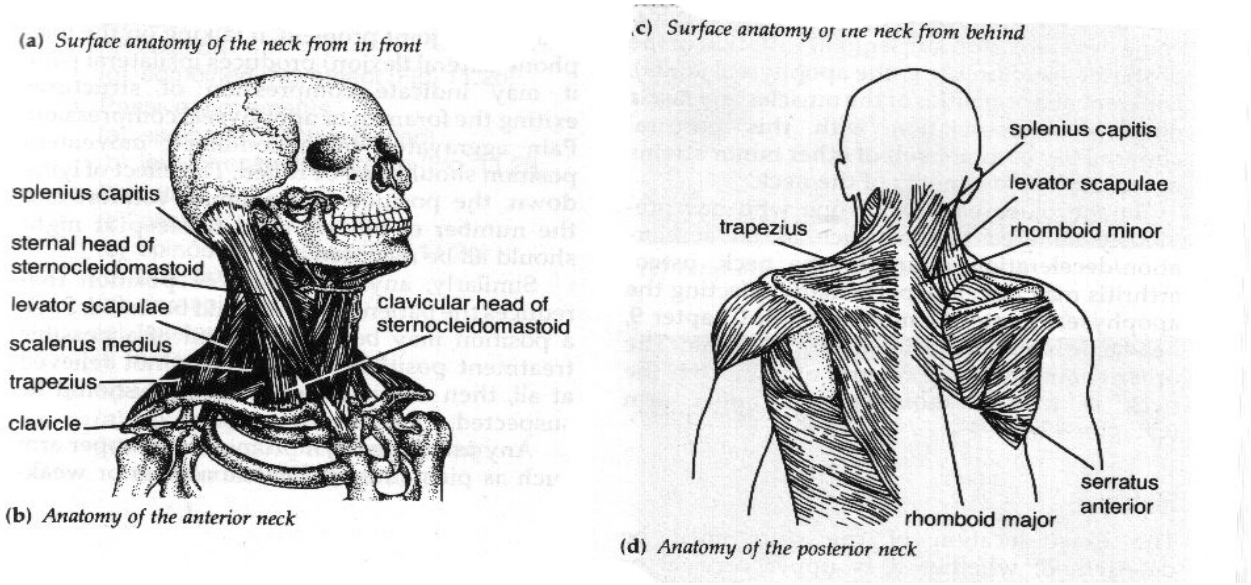

Figure 11 - Anatomy of the neck (*Clinical Sports Medicine* 1999, p181)

One common cause of neck injury suffered by TIs is 'hard' openings. Unfortunately, hard openings are relatively common with 65% of respondents to the questionnaire having experienced a hard opening. A 'severe' or 'very hard' opening can result in an acute acceleration/deceleration injury commonly known as 'whiplash'. It is also common for headache to be associated with neck pain. Another common site of referral pain from the neck is to the shoulder and upper arm. (*Clinical Sports Medicine* 1999, p182)

With an acceleration/deceleration injury, initial pain comes from damage to the cervical discs. Muscles, ligaments, capsular tissue and other soft tissue can also be damaged. "This can be an extremely difficult condition to treat, particularly as the damaged discs may undergo progressive degeneration." (*Clinical Sports Medicine* 1999, p192) Interestingly, it is typical with this type of injury for people not to complain of pain at the time of injury. Rather, there is usually a gradual increase in the intensity of the pain in the 48 to 72 hours following the injury. It is thought that "considerable benefit can be gained by immobilising the neck in a soft cervical collar until inflammation is controlled. This may be for up to three to seven days." (*Clinical Sports Medicine* 1999, p192) This can involve convincing the person with minor neck pain to wear the collar in order to prevent symptoms developing. Other treatments for this type of injury include a combination of active range of movement exercises, gentle mobilisation, soft tissue therapy and stretching. (*Clinical Sports Medicine* 1999, p192)

Preventative measures TIs can take to avoid this type of injury include stretching and strengthening neck exercises. Warm-up the neck muscles with a quick five minute stretch and strength routine immediately prior to going for a jump. Also, get a regular remedial/therapeutic massage. The benefits of massage are many. "Massage can increase muscle range of motion, increase the circulation and nutrition to damaged tissue and deactivate symptomatic trigger points. As well as improving soft tissue function, regular massage provides the opportunity for the masseur to identify any soft tissue abnormalities which, if untreated, may progress to injury." (*Clinical Sports Medicine* 1999, p79) Take that little bit of extra time to pack with better care to help reduce the occurrence of a hard opening. Take care of your neck when deploying the parachute. Brace your neck by tucking your chin into your chest and shrugging your shoulders. This will

increase the muscle tension and allow for less head movement should a 'hard' or 'fast' opening occur. Don't look up at the parachute until line-stretch and initial deployment of the parachute is felt. This will help to keep your neck in better alignment and therefore better protected and less likely to get injured. Also, try to keep your head 'square' when deploying, not twisted or rotated in any way. Again, correct alignment of your neck and shoulders at deployment time will help to reduce the risk of neck injury should a hard opening occur.

Overuse Injuries

Shoulder Pain

"Any repetitive activity can lead to an overuse injury." (*Clinical Sports Medicine* 1999, p16)

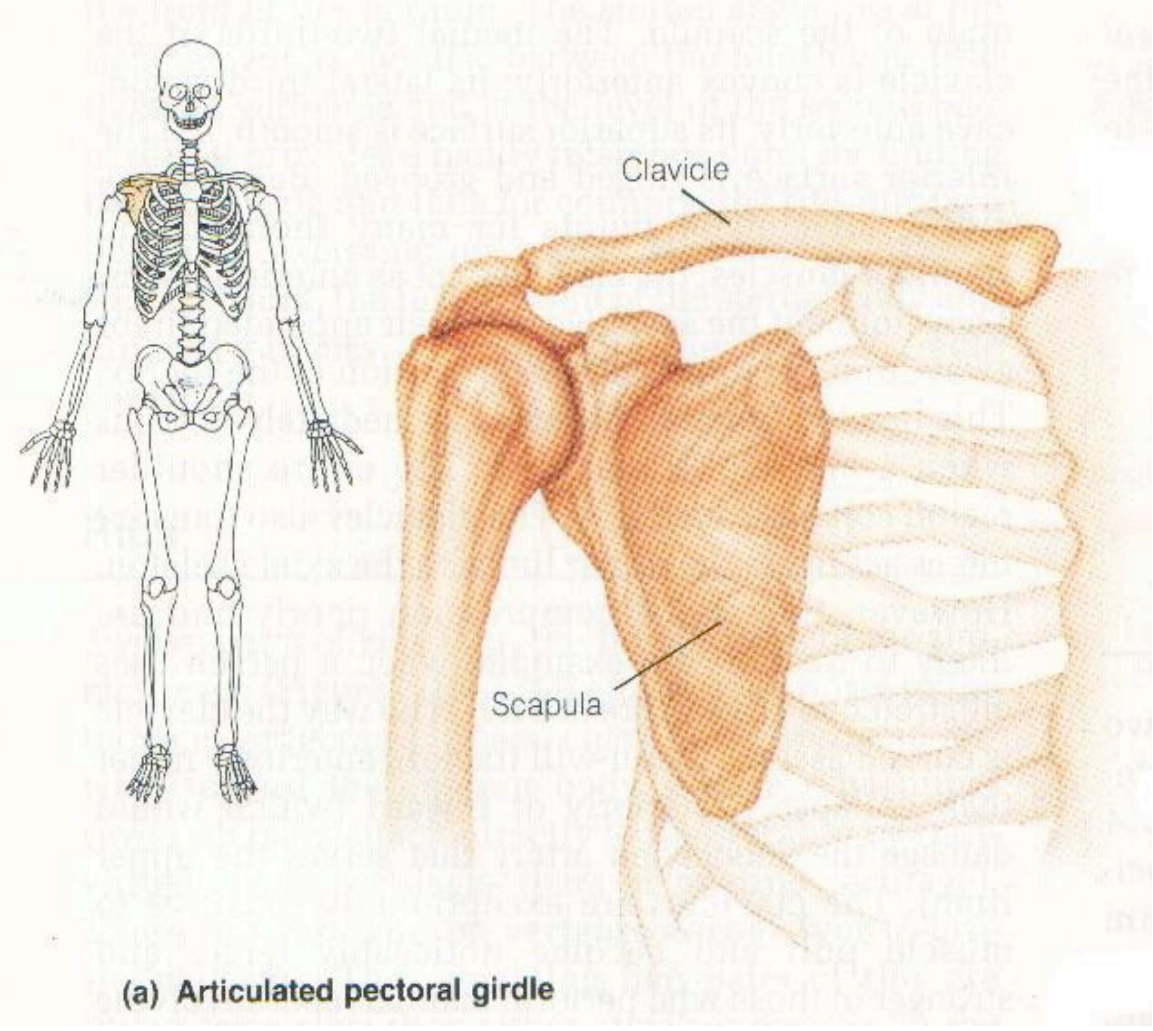

Figure 12 – Bones of the pectoral girdle (*Human Anatomy and Physiology* 1992, p204)

The shoulder or glenohumeral joint is a ball and socket joint. "The socket of the shoulder joint (the glenoid cavity) is small, shallow, and poorly reinforced by ligaments. Although this arrangement is good for flexibility, it is bad for stability and shoulder dislocations are fairly common." (*Human Anatomy and Physiology* 1992, p203) (Figure 12, 13 and 14)

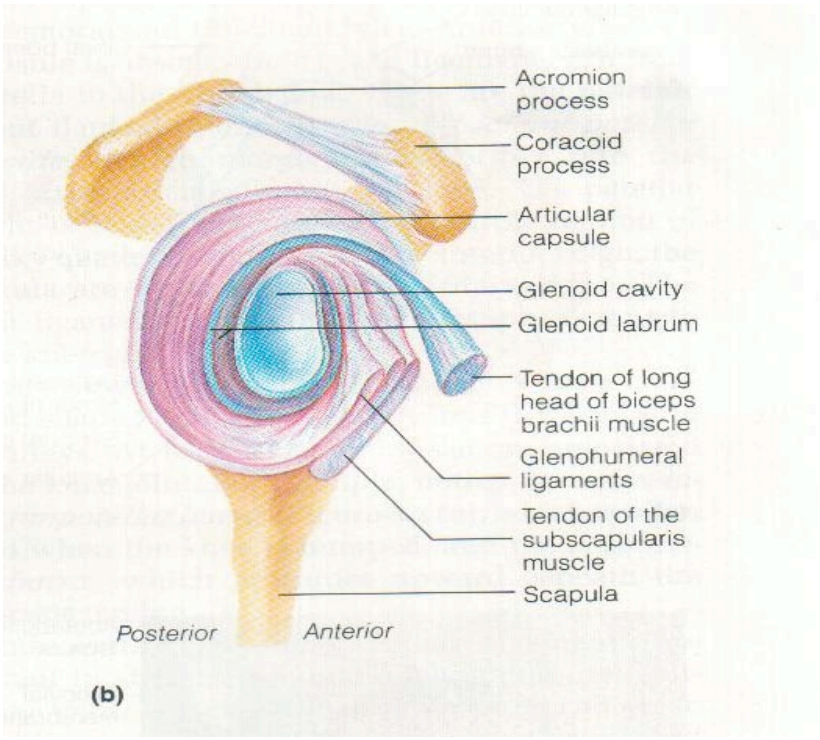

Figure 13 - Shoulder joint relationships (*Human Anatomy and Physiology* 1992, p235)

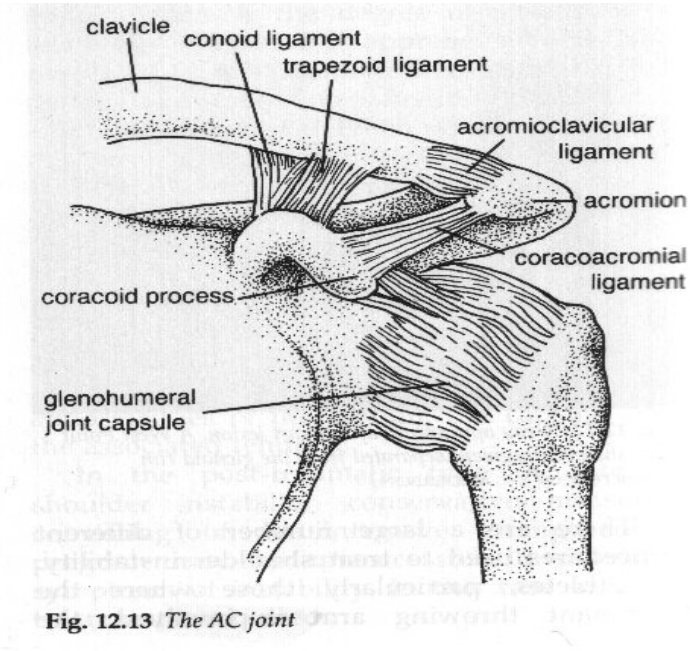

Figure 14 - The AC joint (*Clinical Sports Medicine* 1999, p210)

There are numerous ways that TIs can injure their shoulders. With regards to overuse type injuries, shoulders are vulnerable areas due to the high workload they have during the course of a normal tandem skydive. From the weight of carrying the rig, to tightening the harness (especially the side connectors), freefall attitude, flying the canopy and flaring, packing and even the higher

workload of the left shoulder joint when handicam jumps are being conducted. Any and/or all of these movements can contribute to an overuse injury of the shoulder joint.

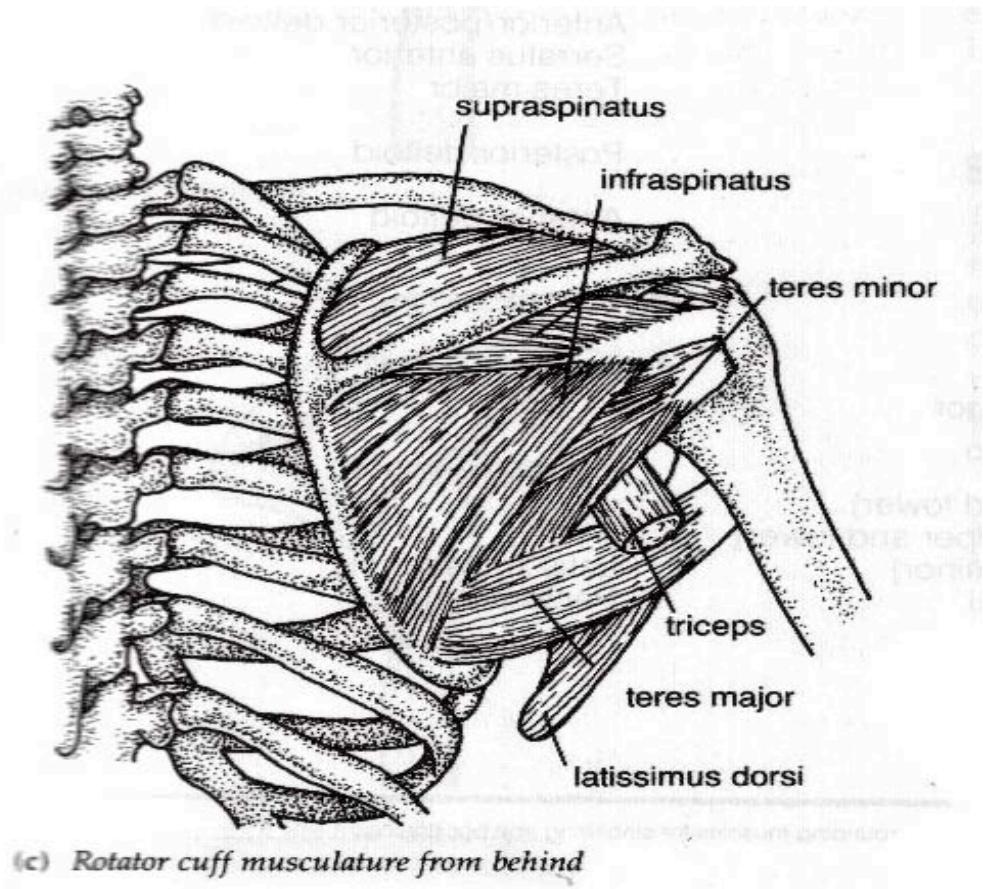

Figure 15 – Rotator cuff musculature from behind (*Clinical Sports Medicine* 1999, p195)

Taking a closer look at what can happen, "shoulder impingement syndrome is a common cause of shoulder and upper extremity pain and dysfunction." (*Biomechanics* 1996, p 177) "Typically impingement occurs in athletes or workers who engage in repetitive overhead activities." (*Biomechanics* 1996, p 177) An example of this would be reaching for toggles and flying the canopy.

To understand shoulder impingement, some basic anatomy of the shoulder joint and its associated structures and musculature is required. Impingement is all to do with the subacromial space. This space lies between the top of the humerus (glenohumeral joint) and the other bony structures of the scapular and clavical (the acromion, coracoacromial arch and the AC joint) that make up the shoulder joint. (Figure 15 and 16)

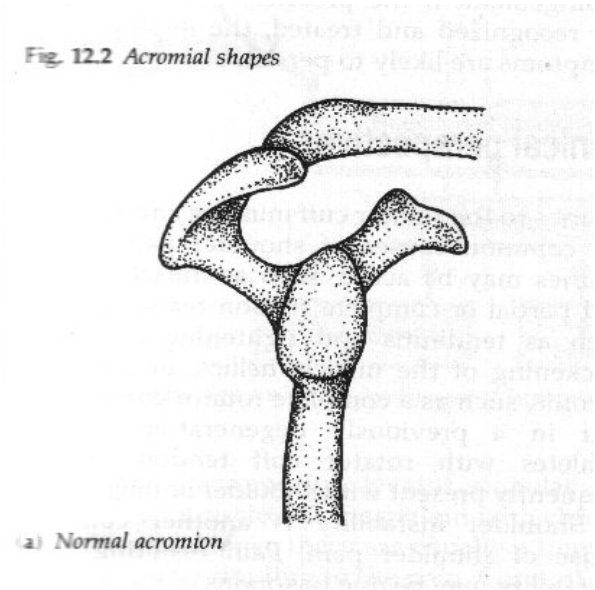

Figure 16 - Acromial shapes (*Clinical Sports Medicine* 1999, p197)

Through this space lie muscles, tendons and nerves. Any condition which narrows this space will then squeeze or impinge these structures causing pain, swelling and damage. "Shoulder or subacromial impingement is a general term used to describe pain that originates from the compression of structures between the humeral head and the coracoacromial arch, the acromion and the AC joint. Any condition that causes a narrowing of the subacromial space or an enlargement of subacromial structures can lead to impingement of these structures." (*Biomechanics* 1996, p 179) "Impingement may occur as a result of encroachment from above, swelling of the rotator cuff tendons, or excessive elevation of the humeral head." (*Clinical Sports Medicine* 1999, p197) Encroachment from above results from muscle instability and weakness and allows the movement of the acromion forward and downwards, encroaching on the subacromial space. "The excessive load placed on the rotator cuff as a result of shoulder instability leads to rotator cuff fatigue and eventually may cause inflammation and swelling." (*Clinical Sports Medicine* 1999, p195) This swelling of the rotator cuff tendons will cause narrowing of the subacromial space and may be due to an overuse tendonitis. "Excessive elevation of the humeral head may also occur as a result of imbalance between the elevators of the humeral head (deltoid) and the humeral head stabilisers (rotator cuff muscles)." (*Clinical Sports Medicine* 1999, p198) This can lead to the excessive movement upwards of the humeral head which will narrow the subacromial space and put pressure on the rotator cuff tendons, causing pain, damage and swelling. This can then be the beginning of a vicious cycle where impingement causes swelling which causes further impingement and so on. This is explained further in the following diagram, Figure 17.

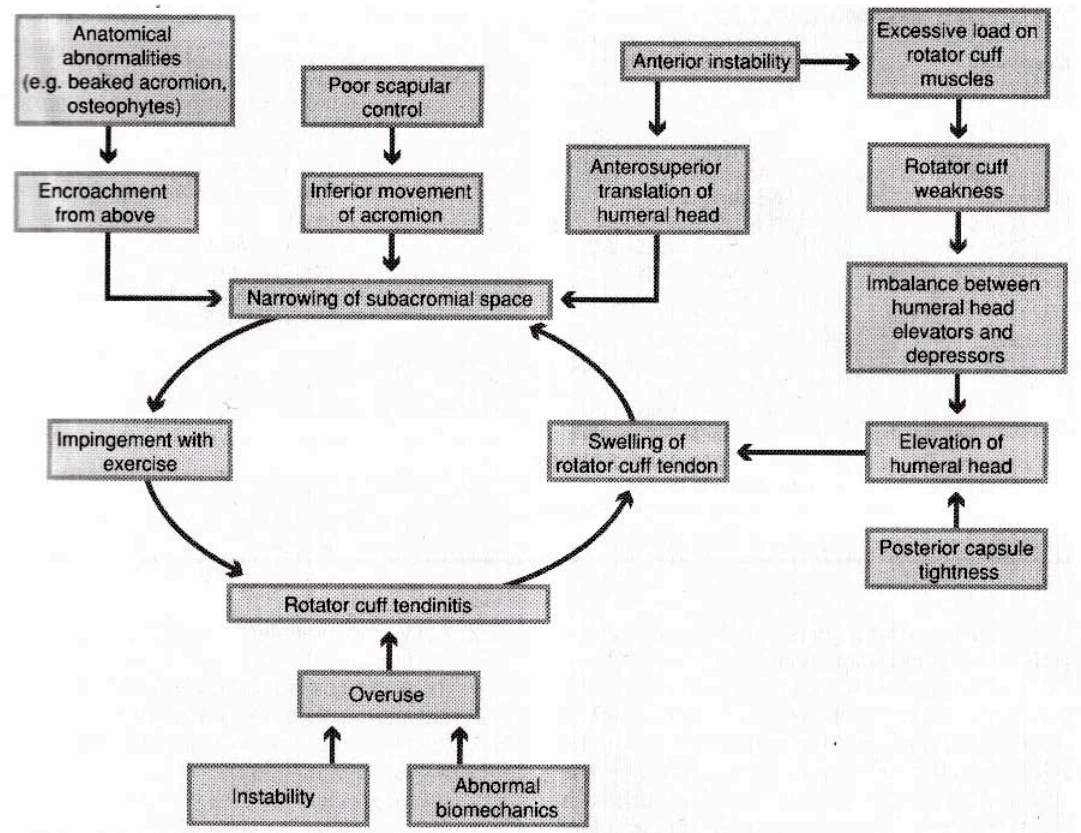

Fig. 12.4 *Factors involved in the development of impingement*

Figure 17 - Factors involved in the development of impingement (*Clinical Sports Medicine* 1999, p199)

Therefore with any shoulder impingement injury it is important to seek professional advice and treatment early on and avoid further impingement and the possible development of rotator cuff tendonitis. In addition any shoulder instability and muscle imbalances need to be corrected as quickly as possible to reduce further risk of injury. The treatment of shoulder impingement will typically include the initial avoidance of the aggravating activity or movement, icing, electrotherapeutic modalities such as ultrasound, soft tissue therapy and even acupuncture. Correction of any shoulder instability, muscle weaknesses and imbalances, shoulder complex flexibility and/or tightness issues can be addressed with an exercise program specific to the needs of the individual. (*Clinical Sports Medicine* 1999, p199)

Preventative measures that can be taken to avoid shoulder injury such as impingement syndrome and rotator cuff tendonitis involve a regular physical exercise routine. Maintaining muscular strength, flexibility and muscle group balance will decrease shoulder instability and most of the factors involved in causing the narrowing of the subacromial space. If you do happen to live coastal, surfing is a great way of helping to achieve this. Another consideration is warming up the shoulder joints immediately prior to the first jump of the day with exercise and stretching. Also, slightly altering your technique at the first sign of shoulder pain can help to alleviate the problem.

General Recommendations for the Prevention of Injuries to Tandem Instructors

"To prevent injuries it is necessary to have information about the factors that contribute to their occurrence" (www.injuryprevention.org/)

Considering the preventive measures already covered, some general recommendations for Tandem Instructors to prevent injuries include:

- Maintain good general physical fitness with regular exercise, including stretching and strengthening routines. Yoga and Pilates are highly recommended. If it is an option, surf regularly to strengthen the shoulders.
- Be very choosy and cautious when assessing the weather conditions. Jump only in conditions which are suitable to your specific landing areas. If you have any doubt regarding the landing conditions, do not jump. As we all know, it is better to be safe than to be sorry.
- Use a proper lifting technique when putting on a tandem rig. Lift with your legs not your back and lift the rig onto a chair, bench or stool. Then put the rig on from a near to upright position. Do not awkwardly rotate the back.
- Warm-up and loosen-up before the first jump of the day and after any breaks during the day. It is also beneficial to cool down at the end of the day. Stretch all major muscle groups and pay particular attention to the neck, shoulders, hips and legs.
- When deploying, brace your neck muscles and keep your neck and shoulders 'square' and in good alignment. Always be prepared for the worst at opening time.
- Avoid any pivoting, twisting or rotational movements during landing to help protect the knee joint.
- Get a regular massage, particularly neck and shoulder, to loosen up the muscles.
- Use a combination of bracing and taping following certain injuries to increase stability and strength of specific structures and to decrease the chances of re-injuring the same structure.
- Do not become complacent or over-confident. All too often, Mr Cool becomes Mr Fool in the blink of an eye…

Conclusion

Common injuries to TIs were identified through a combination of a questionnaire and subsequent analysis of that information, along with an analysis of the past six years of the APF news-sheet's tandem incident and injury reports. From these sources it was evident that the most common areas of injury to Tandem Instructors are the coccyx, lower back, knee, neck and shoulder.

Following on from the identification of the injuries, the specific injuries of broken/bruised coccyx, 'slipped' lumbar intervertebral disc, ACL knee ligament tear/rupture, acute acceleration/deceleration or 'whiplash' injury of the neck and the overuse injuries of shoulder impingement syndrome and rotator cuff tendonitis were analysed. Additional consideration was given to the usual cause of such injuries and it is landing incidents that are causing the overwhelming majority of injuries to TIs (up to 80%!) Specific preventative measures were discussed, such as the avoidance of pivoting, twisting or rotational movements during landing to help protect the knee joint, which is particularly vulnerable to these movements. General recommendations for injury prevention were then outlined for Tandem Instructors to consider in order to avoid injury.

From this information it is hoped that suitable precautions and preventative measures can be taken, by individuals and training organisations alike, to minimise the risk of TIs suffering personal injury whilst conducting tandem descents.

By looking after ourselves and each other, we can maintain an excellent safety record for tandem skydiving Australia-wide. This will only increase the appeal of tandem skydiving as a 'must-do' activity and not only keep professional tandem instructors in a job, but as well as this, introduce as many new people as possible to the world of skydiving.

Appendix 1

Questionnaire
Tandem Instructor Injuries

The purpose of this questionnaire is to investigate common Tandem Instructor injuries associated with Tandem Skydiving. The information provided in this questionnaire will be used to research my thesis topic "An Investigation in to Common Tandem Instructor Injuries" – Rob Carberry

1. What is your current level of experience as a Tandem Instructor?

…….... Tandem Jumps	…….. Years/Months as a TI

2. Are you currently or have you previously been employed as a full-time Tandem Instructor?

❑ Yes	❑ No
If yes, for how long? …….	

3. Have you ever injured yourself whilst performing a tandem skydive?

❑ Ankle	❑ Knee	❑ Groin
❑ Hip	❑ Coccyx	❑ Lower back
❑ Upper back	❑ Shoulder	❑ Neck
❑ Facial	❑ Elbow	❑ Wrist
❑ Other, please specify ……		

4. What do you consider the most common injuries to Tandem Instructors to be?

……
……
……

5. What do you consider the most common cause of these injuries to be?

❑ Landing	❑ Freefall	❑ Opening (hard)
❑ In plane	❑ Climb out	❑ Lifting/carrying rig
❑ Packing	❑ GCO error	❑ Unfit/uncurrent TI
❑ Large/unfit tandem passenger	❑ other, please specify …….……..……..	

6. Have you ever experienced a 'very hard opening', resulting in any injury, soreness or pain?

❑ Yes	❑ No
If yes, please give a brief description …… …… ……	

7. Have you ever experienced a 'hard landing', resulting in any injury, soreness or pain?

❑ Yes	❑ No
If yes, please give a brief description of the injury and the conditions on the day …… …… …… ……	

8. Do you have any suggestions as to what a Tandem Instructor can do to minimise the risk of personal injury?

……

……

……

9. As a Tandem Instructor, what has been your most serious injury?

Briefly discuss what and how? ……

……

……

……

10. How long did the pain/soreness associated with this injury last?

……

11. Did you seek any treatment such as physio/chiropractic, etc?

❑ Yes	❑ No
If yes, please specify …… ……	

12. Did you take time off from jumping to allow the injury to heal?

❑ Yes	❑ No
If yes, how long? ……..…….	
……...……	
……...……	

13. Do you have to 'look after' any specific areas of your body to prevent aggravating an old or reoccurring injury?

❑ Yes	❑ No
If yes, please give details ……..…….	
……...……	
……...……	

14. Do you have any ongoing injury concerns, such as neck/back pain, that require preventative management?

❑ Yes	❑ No
If yes, please give details ……..…….	
……...……	
……...……	

15. Do you or have you ever used any form of strapping/taping or braces (ankle brace, knee brace, etc) to help support an injured area whilst continuing to jump?

❑ Yes	❑ No
If yes, please give details ……..…….	
……...……	
……...……	

16. Do you regularly stretch or follow a physical exercise routine?

❑ Yes	❑ No

17. After a big weekend/ few days jumping, do you suffer from sore/stiff muscles?

❑ Yes	❑ No
If yes, briefly describe where the soreness is located and any reasons why you think this may be	
……..…….	
……...……	

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