**Presentation Script – A 25-year old boxer complaining of dizziness with neck pain**

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**SLIDE 1** – cover page

**SLIDE 2**

It is very difficult to diagnose neck pain conditions because many of the signs and symptoms are very similar. During the subjective assessment it is important to establish:

* The onset of injury – was it an initial onset or recurrent, did symptoms arise from a direct or indirect force, was the onset gradual or rapid.
* Mechanism of Injury (MOI) – what caused the injury?
* Red flags and contraindications e.g. night pain affecting sleep
* The area, nature and intensity of the neck pain – the area of pain indicates the source, the nature – is it a throbbing pain, a dull ache, a piercing pain, is it constant? What are the easing and aggravating factors?
* Past medical history and current medications. Past injuries may have an impact upon the client’s current injury. Medications may indicate another condition that could have impact upon the neck pain and dizziness.
* Psycho/social factors – factors occurring in family life, work life, training schedule can all have an impact upon the injury

**SLIDE 3**

During the subjective assessment (SA) it is important to consider when the neck pain and dizziness began (the onset) and the Mechanism of Injury (MOI). This will give you an indication of whether the injury is in the acute, subacute or chronic phase.

In boxing the mechanism would be a direct blow to the head. Boxing is a very physical sport. In competition the main objective is to inflict blows to the body and head and to achieve a technical knockout (TKO), or a complete knock out (KO) of an opponent. A TKO is the failure of a boxer to get up before the referee counts to 10 after being knocked down by their opponent, or has received a laceration, or orthopaedic injury. A KO is where the boxer fails to get up after being knocked unconscious (Neidecker et al. 2019).

The injuries detailed below are more common in boxing and likely to be the common cause of neck pain and dizziness:

* Sports-related concussion (SRC)
* Post-concussion syndrome
* Whiplash Associated disorders (WAD)
* Cervicogenic Headaches
* Wry Neck

**SLIDE 4** - Table

*Column 1*

Sports-related concussion (SRC) can be caused by a direct blow to the head, face, neck or elsewhere on the body (Echemendia et al., 2017). Signs and symptoms are:

* Somatic e.g. headache, nausea, vomiting, light & noise sensitivity and problems with vision
* Cognitive e.g. foggy feeling, difficulty concentrating and memory problems
* Physical e.g. loss of consciousness (LoC), confusion, difficulty making eye contact, slurred/slow speech, sluggish
* Problems with balance e.g. dizziness, difficulties with walking and stumbling
* Behavioural changes e.g. irritability
* Cognitive impairment e.g. slow to react, slow to answer questions and disorientated
* Disturbance of sleep patterns and drowsiness

(Neidecker et al., 2019)

A 5-year study by (Loosemore et al., 2015) of elite amateur boxers reported the incidence of concussion as low - 0.53 concussions for every 1000 hours of competing/training.

*Column 2*

Post –concussion Syndrome

If the client has experienced three or more of the symptoms below, a month or more after a SRC they should be referred to their GP or a Neuropsychologist:

* Headache
* Dizziness
* Depression and anxiety,
* Difficulty sleeping
* Irritability
* Feeling tired and low in energy
* Difficulty concentrating, feeling foggy

A boxer who hasn’t recovered from a previous concussion is at risk of a potential second blow to the head, referred to as Second impact syndrome (SIS). It is important therefore to monitor boxers for persistent post-concussion symptoms. Post-concussion symptoms can be monitored by the Sport Concussion Assessment Tool – 5th Edition (SCAT 5), (McCory et al., 2016).

*Column 3*

Whiplash is an acute acceleration-deceleration injury (Spitzer et al., 1995) resulting from a sharp, sudden impact e.g. motor vehicle collision or a blow to the head. It can cause damage to the cervical vertebrae and soft tissues in the neck. Signs and symptoms are:

* Neck pain and stiffness - aggravated by neck movement and a reduction in the range of motion (ROM )of the neck
* Headaches – usually occurring at the base of the skull
* Tenderness in upper body e.g. shoulder, upper back and arms
* Tingling or numbness in the arm
* Fatigue and dizziness
* Other less common symptoms to be aware of are blurred vision, tinnitus, sleep disturbances, irritability, memory problems, reduced concentration and depression

*Column 4*

Cervicogenic headaches are secondary headaches which are usually caused by an underlying condition e.g. neck injuries, severe high blood pressure and infections. Signs and Symptoms:

* Unilateral headache – pain on one side of the face or head
* Constant dull ache – in the neck, shoulder or arm on one side
* Pain and stiffness in the neck and reduced ROM
* Pain around the eyes
* Pain can be triggered by certain movements
* Sensitivity to light and noise
* Nausea
* Blurred vision

*Column 5*

Wry Neck can be caused by a sudden movement or upon waking after sleeping in an awkward position.

Signs and symptoms are:

* Neck pain or stiffness
* Difficulty moving head
* A headache
* Swollen neck muscles
* Chin tilted to one side
* One shoulder higher than the other

**SLIDE 5**

During the SA it is important **not to miss** signs and symptoms that may indicate a more sinister underlying pathology that may require further medical assessment and referral to a GP. These are referred to as Red Flags and Contraindications. Neck pain and dizziness could be an indication of the following Red Flag conditions:

* Cardiac –Neck pain & dizziness are common symptoms of a heart attack, transient ischemic attack and cardiomyopathy
* Cervical arterial dysfunction – includes vertebrabasilar insufficiency (VBI) and cervical arterial dissection. Unusual neck pain or headache with acute onset, ↑ in severity over a matter of hours or days
* Cranio-cervical ligament injury – acute neck pain with perioral paraesthesia, tinnitus, nausea, lump in throat
* Cervical Radiculopathy – pinched nerve, irritation of nerves radiating down the arm. Can be a sign of prolapsed disc, cervical spondylosis or arthritis
* Fracture of cervical vertebrae
* Cancer – Epstein Barr virus
* Rheumatoid Arthritis
* Infections – e.g. Meningitis

Red Flags and contraindications should be eliminated before progressing further with the clinical examination.

**SLIDE 6**

The area, nature and intensity of pain

It is important to establish the area, nature and intensity of the pain:

* **Area of pain** will give an indication of the source e.g. upper cervical-head (C0-4), mid-to lower neck (C4-5), lower neck to, upper thoracic and shoulder/arm region (C5-7), posterior, anterior, unilateral or bilateral tingling/nerve pain
* **Nature of the pain** can give an indication of the pain mechanisms. A catching pain or an ache of mild to moderate intensity would indicate an issue with the joints, ligaments or muscles. A more severe, piercing, burning pain would indicate neuropathic pain e.g. a stinger caused by traction to the Brachial Plexus. The intensity of pain can be measured by the Visual Analogue Scale (VAS), from 1-10 (1 indicates low intensity, 10 indicates high intensity).
* **Aggravating & easing factors** – establish the movements, activities and postures that aggravate or ease the pain. Does the pain affect sleep? Local head movements could indicate segmental joint dysfunction.
* **High or low irritability** – high irritability, pain intensity and acuteness of injury will limit the physical examination and the intensity of treatment.

**SLIDE 7**

Past medical history, current medications, psycho and social factors

* **Past medical history & current medications** – previous injuries or illnesses may have an impact upon current injury. It is important to consider the medications that the client is currently taking as it may be relevant to their current injury or indicate another health issue (cardiac, high blood pressure, rheumatoid arthritis).
* **Psychological factors** – fear of movement, changes in training patterns and participation of sport, how the client is coping with and managing the pain (reliance on medication), anxiety and depression gives the therapist a clearer impression of how the injury is affecting their client and how to manage the injury and subsequent treatment.
* **Social factors** – pressures in the clients work and family life that may have an impact upon the client’s injury – extra stress can cause tension which may be felt in the upper body and neck. This may result in headaches, reduced range of movement and depression. If the boxer cannot fight due to his injury he is unable earn money. He may have financial responsibilities e.g. a young family, a mortgage. The injury could end his career. Does he spend a lot of time looking at his mobile phone?

**SLIDES 8 & 9**

*Subjective Assessment*

The subjective assessment of the client revealed the mechanism and onset of injury. The mechanism was a punch to the head but the client could not remember whether it was frontal or to the side of the head. The client was assessed for concussion ringside and cleared. The onset of neck pain began four days after a competitive boxing bout and severity of pain has increased. He also complained of headaches, fatigue, low moods and regular dizzy spells.

He is not sleeping very well and his shoulders, upper back and arms feel very tender and stiff. The condition is eased by rest – in a reclined position in the dark. This suggests sensitivity to light. The condition is aggravated by turning head left and right and he has ceased training.

(Neidecker et al., 2019)

Current concerns regarding lack of sleep, increasing pain and concussion symptoms. He was cleared for concussion during the bout, however individuals can suffer concussion without losing consciousness and experience different symptoms. Distinguishing concussion and whiplash from each other is quite difficult because the symptoms are quite similar in the early stages and in boxing both can happen simultaneously (Elkin, Elliott, & Siegmund, 2016)

There is no previous medical history of cancer, infection. The client has had an ankle sprain but it is not related to this current injury.

Social and family factors: Our client is married with a 5-month baby. Some of his fatigue could be due to the baby waking at night and is probably still night feeding.

He is a semi-professional boxer so may be feel anxious and stressed due to being under suspension and not being able to earn money. His income from boxing is probably the main income for the family and he will be worried about paying his mortgage and other household bills. He may have a vehicle that he is also paying for. Some of his neck pain could be contributed to tension and stress.

Does he spend much time looking at a mobile phone? Long exposure to looking at a mobile phone can have an impact upon posture and the neck muscles.

He trains 5 days per week which includes sparring and weight training. He also runs 3-5 miles twice a week for cardiovascular/aerobic fitness. He is feeling down because of the neck pain, regular headaches and dizziness. He is finding it difficult to concentrate on anything.

*Objective assessment*

Observing the client when walking, he was holding his head more to the right side and his chin was slightly tilted. There was some guarding due to fear of movement because of pain.

The shoulder and thoracic spine were cleared through active movements with over pressure.

Upon palpation the cervical spinous processes were tender. The neck muscles felt tense upon palpation of the neck muscles (Trapezius, Sternomaclastoid and Levator Scapula) due to swelling. The skin around the neck was slightly red in colour. The neck felt warm after touching with the back of the hand.

Active range of motion was limited in flexion, extension, lateral flexion left and right and left and right rotation. The client found nodding of the head yes and no and turning the head left and right very uncomfortable. Passive range of movements to end of range were begun but ceased due to the client being in too much pain. Management of the client was conservative and assessment limited due to the high intensity of pain. Special neurological and muscular tests such as Spurlings, ULTT, Traction and Distraction were not carried out due to the acute stage of the client’s condition.

Myotome testing was possible. Shoulder girdle elevation (C4) and abduction (C5) revealed reduced weakness on the left side of the client’s body. A sensory test (using a piece of cotton wool) was carried out on both arms and there was reduced sensation on the upper left arm (C5).

*Differential diagnosis*

The position of the neck when walking and sitting would seem to suggest a Wry Neck condition. The client’s symptoms of neck pain and headaches and physical signs such as swollen neck muscles and reduced ROM of the neck would certainly fit well with that diagnosis, however dizziness and neurological signs are not usually associated with Wry Neck conditions. The onset of pain for Wry Neck is acute and in this case onset of pain was gradual and worsened over a number of days. Range of motion was also restricted in all neck movements on both sides of the body rather than just the affected side, as would be the case with Wry Neck.

The tenderness over the spinous processes, tension in neck muscles, reduced range of motion in all movements, neurological signs (tingling down the left arm) and the results of the myotome and sensory tests point to a WAD grade III or IV injury. The headaches could be cervicogenic caused by Whiplash condition. The other symptoms of low moods, headaches, light sensitivity, difficulty concentrating are a cause for concern for possible signs sports-related concussion. Individuals can suffer concussion despite not losing consciousness.

**SLIDE 10**

*Conclusion:*

In this case, during the SA and OA there were a number of red flags that gave cause for concern:

* Disturbed sleep
* Acute onset of headache and dizziness
* Increase in the severity of pain
* Neurological signs down the left arm

The above signs could indicate cervical arterial, vertebral or ligament damage. There were also concerns regarding SRC.

Management of the client was conservative and the assessment was limited because of the high intensity of pain and irritability of the condition which was in the acute phase. The findings from the assessment lead to the conclusion that the client should be referred to a GP for MRI scan and also to a neuropsychologist. The client should also be assessed for SRC

Initially pain management is the first priority and can be done with cryotherapy to reduce inflammation to have an analgesic effect for 2-3 days. Care must be taken in the event that the client has skin anaesthesia. Introduce thermotherapy once inflammation has subsided to warm up and loosen the neck muscles and improve range to motion e.g. warm bath, warm wet towels, wheaty bag.

A multimodal treatment programme comprising of motion, stretching and strengthening exercises of the neck flexors and extensors and manual therapy can be put in place after the client has been cleared of any cervical damage or received medical treatment.

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