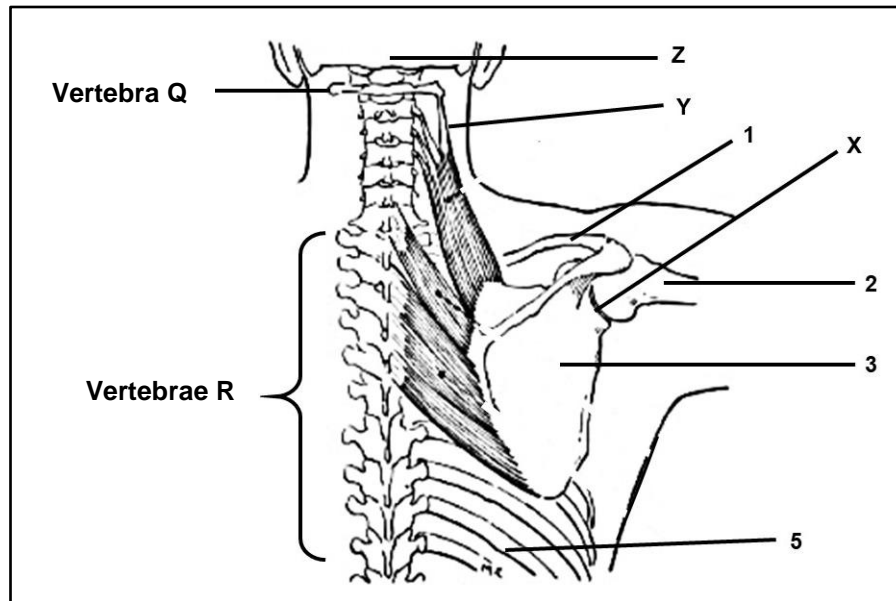


- 3.1. Study the sketch below depicting some of the muscles and bones associated with the pectoral girdle and spinal column in humans. Answer the questions that follow.



- 3.1.1 Which part of the human skeleton is visible in this diagram? (1)
- 3.1.2 Identify the bones numbered **1**, **2** and **3**. (3)
- 3.1.3 Which type of joint is located at **X** on the diagram and describe the movement of this joint. (2)
- 3.1.4 Identify vertebra **Q** and provide **ONE** distinguishable characteristic of this vertebra. (2)
- 3.1.5 Which vertebrae are located at **R**? (1)
- 3.1.6 Identify structure **Y**. (1)
- 3.1.7 *Scapular dyskinesis* is an injury-state where the scapula does not move abnormally causing to pain. It is a common sports injury which usually occurs in circumstances where the scapula is moved in a repetitive manner.

Scientists wanted to investigate the relationship between overhead sports and scapular dyskinesis. (*Overhead sports refer to sport types like tennis and volleyball where the shoulder and arm are repeatedly lifted.*)

They performed the following procedure to collect their data:

- Medical records of all sports injuries between 2018 and 2019 were collected from three prominent hospitals in the province. This was a total of 10 000 cases.
- The total number of cases with scapular dyskinesis was noted.
- For each case of scapular dyskinesis they also noted the type of sport that caused the injury.

- (a) State a suitable hypothesis for the scientists' investigation. (2)
- (b) Why can this investigation be regarded as fairly reliable? (1)
- (c) Use your knowledge of the scapula, glenoid cavity and upper limb to explain why overhead sports are more likely to cause this type of injury rather than an injury to the acetabulum through repetitive movement of the legs. (3)

MEMO

3.1

3.1.1 Axial skeleton✓ (1)

3.1.2 1 - clavicle✓

2 - humerus✓

3 – scapula ✓ (3)

3.1.3 Ball and socket✓

Allows movement in all direction / free movement / 360 degree rotation✓ (2)

3.1.4 Q - atlas✓*

ANY ONE CHARACTERISTIC:

- no vertebral body/centrum

- large vertebral canal

- no transverse processes

(*compulsory mark + 2 other facts) (2)

3.1.5 thoracic✓ vertebrae (1)

3.1.6 Tendon✓ (1)

3.1.7

(a) *Scapular dyskinesis* occurs more frequently in overhead sports ✓✓

OR

The practicing of overhead sports increases the risk of *Scapular dyskinesis* ✓✓ (2)

(b) **ANY ONE REASON:**

- a large sample of 10 000 cases was used✓

- the reports from three prominent hospitals was used✓ (1)

(c) **ANY THREE FACTS:**

- The glenoid cavity is shallower✓

- the acetabulum sits deeper✓

- therefore the glenoid cavity experiences more movement✓ / acetabulum experiences less movement

- Scapula sits loosely over the pectoral girdle / acetabulum is fused with the pelvis✓

- makes it easier to injure ligaments / tendons of the scapula✓ (3)

(16)