**Part 1: Research notes**

**Research Notes**

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| --- | --- |
| **Description** | **Mark** |
| Causes and symptoms of osteoporosis – at least three of each or zero | 1 |
| Causes and symptoms of osteoarthritis – at least three of each or zero | 1 |
| Effect of osteoporosis and osteoarthritis on the bones/joints 1 mark general/2 mark comprehensive detail | 1–2 |
| Current medical technology used for treatment of osteoporosis and osteoarthritis – four for each minimum (2 non-medical and 2 medical and description is needed not just name. | 1 |
| **Total** | **/5** |

**Part 2: In-class assessment**

1. Explain what osteoporosis is and discuss which symptoms a doctor could look for to help identify which condition an individual had. (3 marks)

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| **Description** | **Mark** |
| **Osteoporosis**   * Loss of calcium / bone density / weakening of bone | 1 |
| **Symptoms** |  |
| * 3 symptoms | 2 |
| * 2 symptoms | 1 |
| * 1 symptom | 0 |
| Can include :  Brittle bones / bones break easily / back pain / loss of height / stooped posture | |
| **Total** | **/3** |

1. Although the two diseases are often associated with old age there are specific causes that can lead to the development of the two diseases.

Describe two major causes of osteoarthritis / osteoporosis, discussing how they lead to the development of the disease. (4 marks)

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| **Description** | **Mark** |
| **Causes** *– any 2 of the following*   * amount of bone mass gained in youth * lack of calcium in diet * lack of oestrogen in women(or menopause) * lack of androgen in males * lack of vitamin D * lack of weight bearing exercises * over use of corticosteroids * thyroid problems * bone cancer | 1-2 |
| **Development**   * describes how cause chosen leads to development | 1-2 |
| **Total** | **/4** |

(c) Discuss why people would say that osteoporosis is an elderly lady’s disease. (4 marks)

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| --- | --- |
| **Description** | **Mark** |
| Old ladies make the highest proportion of people with osteoporosis | 1-4 |
| After menopause oestrogen levels drop, men don’t go through menopause so oestrogen levels constant |
| Oestrogen helps with the deposit of calcium in the bones |
| Lack of hormones reduces calcium deposited so bones become brittle = osteoporosis, men’s calcium levels remain constant |
| **Total** | **/4** |

(d) There are many different treatments around for people suffering from osteoarthritis. Some involve medical technologies , (i.e. treatment that you need to see a medical professional for), and others can be carried out by the individual themselves involving no medication.

(i) Explain two non-medical methods that can be used by a person suffering from osteoarthritis.

(2 marks)

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| **Description** | **Mark** |
| In-depth explanation of 2 non-medical methods | 2 |
| States 2 non-medical methods | 1 |
| Can include the following:   * Change in diet to include things such as fish oil *(must have example of something to include in diet)* * Ingestion of Fish oil tablets * Gentle exercise to stimulate repair of joint and reduce inflammation / stretching * Physiotherapy / hydrotherapy / acupuncture * Weight loss decreases weight on damaged joint * Use of icepacks / menthol / gels to reduce inflammation and pain | |
| **Total** | **/2** |

(ii) - Name one medical technology, (other than the administration of drugs), that can be used to treat a person suffering from osteoarthritis. (1 mark)

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| **Description** | **Mark** |
| Any of the following for 1 mark:   * Joint replacement * Cartilage replacement/Autologous chondrocyte – using own cartilage cells to instigate cartilage regrowth to repair damage * Joint fusion * Arthroscopy * Osteotomy | 1 |
| **Total** | **/1** |

* Discuss how the technology is used and why it is suitable for the treatment of osteoarthritis. (3 marks)

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| **Description** | **Mark** |
| **Joint replacement** –   * if the damaged surface can be removed then there will be no more rubbing of bone against bone * Less rubbing reduces pain, less pain swelling goes down * No more arthritis   *Can mention the following:*  **Partial JR**   * Only in one portion of the joint * Less invasive | 1-3 |
| **Cartilage replacement/Autologous chondrocyte replacement therapy** –   * chondrocytes from healthy cartilage are taken * Cells implanted into the damaged cartilage, debris removed * Cells should regrowth and replace the damaged cartilage with healthy tissue | 1-3 |
| **Joint fusion**   * When joint replacement fails, the surgeon can try another technique that removes a joint completely from the ends of the two bones that connect it. * The bones are then held together with screws, pins, or plates. * Over time, the bones should fuse into one piece. | 1-3 |
| **Arthroscopy** -   * Look inside joint through small incision, inserts tube and * remove floating pieces of bone or cartilage or other debris from the joint * smooth out rough surfaces, or remove swollen tissues | 1-3 |
| **Osteotomy**   * If you're still young and active and you've got knee or hip osteoarthritis, you may be able to have an osteotomy, or joint-preserving surgery. * By cutting and removing a section of the bone, this procedure improves joint alignment and stability, and * it could help you delay joint replacement surgery for several years. | 1-3 |
| **Total** | **/3** |

* Describe two risks or side effects that may be associated with the treatment. (2 marks)

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| **Description** | **Mark** |
| **Joint replacement** –   * Anaesthesia: headache / nausea / drowsiness / sore throat / heart attack / stroke (especially if have heart disease / lung problems) / trouble urinating / allergic reactions / nerve injury from needle * Infection * Too much blood loss * Blood clots * Pain and swelling * Breathing problems – pneumonia * Nerve or artery damage * Implant failure | 1-2 |
| **Cartilage replacement/Autologous chondrocyte replacement therapy** –   * Anaesthesia: headache / nausea / drowsiness / sore throat / heart attack / stroke (especially if have heart disease / lung problems) / trouble urinating / allergic reactions / nerve injury from needle * Infection * Graft failure * Rejection of transplant | 1-2 |
| **Joint fusion**   * Infection * Nervous system pain / nerve damage * Bleeding /blood clots * Urinary tract infection * Osteomyelitis * Joint derangement * Painful scar tissue * Arthritis in nearby joints * Pseudoarthrosis | 1-2 |
| **Arthroscopy** -   * Infection * Thrombophlebitis – clot in vein * Artery damage * Excessive bleeding * Allergic reaction * Nerve damage * Numbness * Ongoing pain | 1-2 |
| **Osteotomy**   * Anything associated with anaesthesia * Infection * Nerve damage * Artery damage * Failure of surgery / bones don’t grow together and heal | 1-2 |
| **Total** | **/2** |

(iii) State why the two medical technologies you choose in (ii) would not be suitable for the treatment of osteoporosis. (4 marks)

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| --- | --- |
| **Description** | **Mark** |
| **Per medical treatment:**  In-depth explanation of non-medical methods | 2 |
| States 2 non-medical methods | 1 |
| Example :   * chondrocyte implantation- osteoporosis is lack of calcium in bone matrix, cartilage fine does not cause brittle bones | |
| **Total** | **/4** |