let’s talk rehabilitation
for people with haemophilia
**introduction**

**Bleeding into joints (haemarthrosis) is the most common type of bleeding in people living with haemophilia**¹

It is important to avoid bleeds where possible, since multiple episodes of bleeding can result in progressive and permanent joint damage.²

People with haemophilia sometimes avoid physical activity, thinking that it may cause bleeds. In fact, when carried out properly, regular activity can help prevent bleeds and joint damage.³ Physical activity is important for building healthy bones and to ensure normal motor function, including muscle strength, joint function and balance.⁴ Specific exercises also play a crucial role in getting mobile again following a joint bleed.⁵

This booklet provides information on short-term rehabilitation following a joint bleed, including the role that physical activity and exercises can play as part of the rehabilitation process. It is designed for healthcare professionals to share with people with haemophilia and their families/other caregivers.

**impact of joint bleeds**

For joints to function normally, a number of key components are required (Figure 1)⁶.

- Bones and ligaments – the bones of the joint and the ligaments (strong fibres that play a key role in ensuring joints are stable) must be intact
- Muscles – fully functioning muscles are needed to help stabilise and move joints
- Nerve signalling – signals sent from the brain must reach the muscles and be interpreted correctly to co-ordinate movement.

Joint bleeds can impact on each of these processes and, therefore, reduce joint function.⁷

**Figure 1: Structure of the knee joint**⁶,¹⁵

- Femur (thigh bone)
- Articular cartilage
- Anterior cruciate ligament (ACL)
- Lateral collateral ligament (LCL)
- Fibula
- Patella (knee cap)
- Medial collateral ligament (MCL)
- Posterior cruciate ligament (PCL)
- Meniscus
- Tibia (shin bone)
Short-term impact

When there is a bleed into a joint, the immediate changes include swelling, warmth and pain. Later symptoms include pain at rest and reduced range of motion. Appropriate clotting factor treatment at this stage is needed to stop further bleeding into the joint. The tissue around the joint (the ‘synovium’) breaks down and absorbs the blood from within the joint. After about a week, all the blood is absorbed and the joint returns to how it was before the bleed (Figure 2).
A single bleeding event may be sufficient to provoke inflammation (synovitis)

Recurrent bleeding leads to swelling of the joint and ongoing synovitis

Growth of the joint lining (synovium) leads to an inflamed, vascular and fragile tissue that is more likely to bleed. Further bleeds can destroy the cartilage

Destruction of cartilage leads to long-lasting joint damage, resulting in arthritis and stiffened joints

In later stages, there is complete loss of cartilage and the bone may become deformed, changing the shape of the joint

Figure 3: Joint damage caused by recurrent bleeding

**Long-term impact**

People with haemophilia are at risk of significant bleeds and/or repeated bleeds, often into the same joint. These may cause the tissue around the joint (the ‘synovium’) to become inflamed; this is known as synovitis (Figure 3).

Bleeding occurs in synovial (or ‘hinge’) joints, joints which enable movement at the point of contact of moving bones. Ankles, knees and elbows are examples of synovial joints that are more commonly affected by bleeds (Figure 4). Without appropriate treatment, the cycle initiated by haemarthrosis can lead to chronic synovitis and progressive joint damage (arthropathy).
Over time, repeated bleeds into the same joint can cause permanent damage, including arthropathy and changes to bone mineral density that may lead to osteoporosis.*,2,4 Joint damage can significantly impact on quality of life, with affected people experiencing pain, restricted movement and reduced functional ability.4 In the long-term, people with arthropathy may need orthopaedic surgery to correct or replace damaged joints and restore function.1,4 Repeated bleeds into the same joint can also result in the body adapting and taking on an abnormal posture.3 It is important to prevent these changes from becoming permanent.3 This is the role of post-bleed rehabilitation programmes.

*People with haemophilia can have reduced bone mineral density, largely because of the periods of rest and physical inactivity during recovery from a bleed. If there are signs of haemophilic arthropathy, it may be necessary to screen for any changes to bone density.12
recovery from a joint bleed: the ‘dos’ and ‘don’ts’

Table 1 captures some key ‘dos’ and ‘don’ts’ that should be taken into consideration when recovering from a joint bleed. The subsequent section provides further details on steps for short-term rehabilitation following a joint bleed, including simple exercises that can be performed at home to mobilise the joints.

<table>
<thead>
<tr>
<th>DO</th>
<th>DO NOT</th>
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<tbody>
<tr>
<td>Treat any joint bleeds immediately with clotting factor, ideally within 2 hours and until the bleed resolves.(^4)</td>
<td>Exercise a joint during an active bleed.(^{13})</td>
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<tr>
<td>Undertake appropriate physical activity, as it can help prevent joint bleeds.(^3)</td>
<td>Return to a sport/activity following a bleed without discussing with the Haemophilia Treatment Centre.(^{14})</td>
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<td>Allow an appropriate rest period before resuming activity, to allow for bleed resolution and healing, and prevention of early re-bleeding.(^4)</td>
<td>Forget to appropriately exercise other body parts as able while resting the joint that is healing.(^3)</td>
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<tr>
<td>Put a rehabilitation plan in place to get mobile again following a joint bleed.(^5)</td>
<td>Do high-impact sports or power lifting that may precipitate a joint bleed.(^4,^{13})</td>
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<tr>
<td>Incorporate a range of exercises into rehabilitation plans.(^{14})</td>
<td>Ensure appropriate clotting factor coverage during rehabilitation.(^{14})</td>
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<tr>
<td>Set functional goals that will restore the level of physical activity to what it was prior to the bleed.(^5)</td>
<td>Measure progress.(^5)</td>
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short-term rehabilitation following a mild-to-moderate joint bleed

Management of the bleed
Following any bleed, immediate treatment, within 2 hours if possible, in the form of clotting factor replacement is required.\textsuperscript{4} Factor replacement should be administered as soon as possible, ideally at home.\textsuperscript{4} A combination of Protection, Rest, Ice, Compression and Elevation of the joint may also be helpful (see Box 1).\textsuperscript{4} This method should be remembered and applied after a bleed occurs to help reduce swelling and discomfort. If the damage has been more severe, protecting the joint may involve the use of support aids such as crutches or a sling.\textsuperscript{4}

In rare cases where there is a need to quickly remove a lot of blood from the joint, the physician may consider removing the blood from the joint using a syringe (a procedure known as ‘arthrocentesis’).\textsuperscript{16} Removal of the blood should result in rapid pain relief and reduce the damaging effects of the blood on the joint. However, this management approach must be performed in a medical facility within 24 hours of the bleeding episode and with appropriate levels of replacement clotting factor or other haemostatic agent.\textsuperscript{4} The joint should be completely immobilised with mild compression after aspiration.\textsuperscript{4}

If a bleed persists, advice should be sought from a healthcare professional.\textsuperscript{4}

Box 1: P.R.I.C.E.

- **PROTECTION** – protect the injured joint from undue stress, perhaps by using a sling or crutches.\textsuperscript{4}
- **REST** – rest the joint\textsuperscript{4} for at least 24 hours or longer – take advice from a healthcare professional.
- **ICE** – applying ice can help ease pain.\textsuperscript{4,7} Wrap crushed ice in a damp towel and apply for 10–15 mins. NEVER apply ice directly to the skin.\textsuperscript{15}
- **COMPRESSION** – wrap the injured joint in a bandage or compression stocking for the first 24 hours. Check every 2 hours to make sure the wrap is not too tight. Compression helps to control the amount of swelling and may lead to a quicker recovery.\textsuperscript{4,7}
- **ELEVATION** – elevate the injured area to lower the pressure in the local blood vessels and help to limit the bleeding into the area. Elevating the area will also help to increase drainage of fluids from the injury, which limits swelling.\textsuperscript{4,7}
Pain relief

While clotting factor concentrates should be administered as quickly as possible to stop bleeding, additional drugs may be needed for pain control.\(^4\) Painkillers (analgesics) are the usual choice of treatment although, if necessary, narcotics may be prescribed.\(^4\) A combination of analgesics (with different mechanisms of action) may be the most effective way of relieving pain.\(^16\) Non-steroidal anti-inflammatory drugs should be used with caution.\(^4\) As discussed above, using PRICE can also help reduce the pain of a bleeding episode. However, before prescribing pain medication, the source of the pain should be checked to ensure it is not associated with a new bleed.\(^3,17\) To this end, it is important that people with haemophilia learn to be able to distinguish between pain from arthropathy and pain that could indicate an active bleed.\(^18\) Box 2 shows characteristics of pain associated with a bleed.

Box 2: Characteristics of pain associated with a bleed\(^8\)

- Does not reduce when the joint is rested
- Is accompanied by one or more of:
  - Palpable swelling of the joint
  - Warmth of the skin over the joint
  - Sensation of tingling (‘aura’)
- Reduces with appropriate clotting factor treatment.
Getting mobile again
Any bleeding episode should be followed by an appropriate rest period before returning to physical activity. For severe bleeding episodes that require multiple clotting factor treatments or forced bed rest, or which leave the joints feeling stiff, people should consult with their healthcare team before resuming exercise. In such cases, as soon as the pain and swelling begin to subside, action should be taken to restore joint function. It is important for a thorough assessment to be conducted and an appropriate rehabilitation plan to be put in place. Clotting factor treatment may be needed before attempting mobilisation.

Physiotherapy
In many cases, assessment following a bleed will be conducted by a specially trained physiotherapist, in consultation with the broader multidisciplinary care team. The physiotherapist will design a tailored rehabilitation programme, appropriate for the individual and the damaged joint that takes into consideration the need to prevent further bleeds. Rehabilitation programmes may include low-intensity stretches, tailored strengthening exercises, hydrotherapy and exercises to carry out at home. These programmes should also include an education component, such as:

- Analysis of daily tasks/physical activities to identify potential causes of bleeds and how they can be avoided
- Ensuring the person with haemophilia knows how to monitor for early signs of re-bleeding, especially as they return to physical activity.

The initial goals of exercise following a bleed should be to prevent any additional loss of function and return the joint to its usual state of movement as soon as possible after the bleed. Flexibility and stretching exercises should be performed on the joint during the recovery process, after bleeding has resolved and it is safe to do so.
Stretching and flexibility exercises provide a number of benefits; they decrease muscle soreness, increase joint movement (range of motion, ROM) and – when used as a warm-up prior to physical activity – have the potential to reduce or prevent injury. A variety of stretching techniques are available.5

- Static stretching involves holding a stretch for 15–30 seconds. The best results are obtained when each stretch is repeated 3–4 times at least 2–3 times per week.
- Contract–relax techniques are an example of PNF stretching, where the muscles are gently contracted for 3–15 seconds and then relaxed. Even one repetition can be enough to increase joint movement, but for the best results 1–2 sessions per week are recommended.

The appendix provides examples of flexibility/stretching exercises that can be performed as part of the rehabilitation programme, as recommended by a group of specialist haemophilia physiotherapists and nurses. It is important that advice is sought from an experienced healthcare professional before starting any exercise programme, and that exercises are tailored to the circumstances and needs of the individual patient.5

The individual factor replacement guidelines set by the HTC should be followed when undertaking any physiotherapy or exercise, with administration ideally before the activity.7,14

This is particularly important for people with inhibitors, who are more likely to have musculoskeletal problems than people without inhibitors.21

Assessing functional recovery

As part of the recovery process, it is important to monitor joint function. The aim of rehabilitation is to gradually get back to the level of function that was possible before the joint bleed – or even improve it.4 The process, therefore, should begin by establishing the level of physical activity prior to the bleed and then setting a series of functional goals that can be achieved in a stepwise manner to get back to this.22

Progress can be objectively measured through performance or self-reported assessment tools as well as joint status functional tests.4 It is important that any exercise programme for a person with haemophilia is designed with their functional goals in mind. Functional goals can include returning to work or school, participating fully in social activities or taking up a new sporting activity. Specific exercises and physical activities should be recommended to help individual people with haemophilia achieve their goals, with progress assessed by how much these goals have been achieved.5
Once usual movement has been restored to the affected joint, it is important to remain physically active, as regular activity can help prevent bleeds and joint damage.\textsuperscript{5,14} Ongoing monitoring of the functioning of joints helps determine the success of the exercise programme. In terms of physical assessment, the WFH physical examination scale was until recently the main assessment tool used by specialist physiotherapists.\textsuperscript{23} However, for boys with haemophilia, this is often superseded by the Hemophilia Joint Health Score (HJHS).\textsuperscript{24} The Haemophilia Activities List is a self-completion assessment that measures the impact of haemophilia on functional abilities in adults, including participation in leisure and sports.\textsuperscript{25}

Whichever assessment tool is used, it is important to evaluate:

- Further bleeds
- Pain
- Swelling/synovitis
- Range of movement
- Crepitus (sensation of bone rubbing together)
- Muscle strength
- Gait (style of walking)
- Balance
Sports and leisure activities

There are currently no standard guidelines about returning to sports and physical activity following a bleeding episode and, in most cases, this depends on the individual. Consultation with a healthcare professional will help provide clearer direction on this decision. For some people, muscles and joints may require longer periods of recuperation and periods of rehabilitation before playing sport competitively.

A recent review highlighted the benefits of sports and exercise for people with haemophilia, and included recommendations for safely undertaking physical activity.

In most cases, low impact activities, such as those listed in Box 3, are encouraged. It is important to focus on activities such as these, rather than high-impact sports like football or boxing, as care should be taken so that the exercise undertaken does not provoke new bleeding episodes. All activities can be undertaken at different intensity levels, so people with haemophilia must seek professional advice and tailor their activities accordingly; sports activities have risks as well as benefits. It is also important to have an annual joint assessment carried out by a specialist physiotherapist.

Box 3: Sports recommended as less risky for people with haemophilia

<table>
<thead>
<tr>
<th>Archery</th>
<th>Golf</th>
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<tr>
<td>Aquatics (water exercises)</td>
<td>Hiking</td>
</tr>
<tr>
<td>Elliptical machine</td>
<td>Tai chi</td>
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<tr>
<td>Stationary bike</td>
<td>Snorkelling</td>
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<tr>
<td>Fishing</td>
<td>Swimming</td>
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<tr>
<td>Frisbee</td>
<td>Walking</td>
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Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Exercises to maintain healthy joints and avoid future bleeds include those that focus on strength and balance. The benefits and rationale for these types of exercises are briefly discussed below. These exercises should be practised alongside the stretching/flexibility exercises described previously as part of a long-term rehabilitation programme.

As noted above, individual factor replacement guidelines set by the Haemophilia Treatment Centre should be followed when undertaking any physiotherapy or exercise. Particular care should be taken for people with inhibitors as they are particularly at risk of joint damage and disability.

**Strength**

There are a variety of benefits to improving strength through resistance training. These include decreased pain; increased muscle strength, endurance and power; improved ability to perform tasks such as walking and sitting; and a reduced risk of further bleeds and joint damage. In addition, resistance training can improve the strength of tissues and bones, decrease the risk of heart disease, increase fitness, improve bodyweight and reduce stress.

Resistance training, for example exercises such as squats or bicep curls, involves contracting muscles in the presence of a load (e.g. a weight or against gravity) or resistance (e.g. doing exercises in water):

- Studies have shown that resistance training is best performed over a period of approximately 6–8 weeks, and should consist of 2–4 workouts per week, comprising 6–10 repetitions performed 3–4 times, with 2–4 minute rests between each set.
- It is important to warm up before doing any resistance training and to cool down afterwards by stretching those muscles to be exercised.

The Appendix provides examples of simple strengthening exercises that are recommended for rehabilitation of commonly affected joints in patients with haemophilia. Advice should be sought from an experienced healthcare professional before starting strengthening exercises to ensure they are tailored to the individual’s needs and capabilities.

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Joint stability and balance

Repeated bleeds can affect balance and stability. A long-term rehabilitation plan needs to maintain and/or improve these functions otherwise the patient may be at an increased risk of accidents and falls and, in turn, further bleeds and damage. If balance has been impaired, support such as crutches or walkers should be provided and there are a variety of exercises that can be integrated into the rehabilitation programme to help restore balance. Initial balance exercises may involve simple tasks such as bending the knees and standing. As balance improves, the exercises may become progressively more complex. For example, they may involve shifting from one leg to the other or using moveable surfaces such as balance boards. The Appendix provides some examples of balance exercises for rehabilitation of commonly affected joints in patients with haemophilia. Again, it is important to tailor to the individual a programme of balancing exercises that will provide the most benefit.
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Haemophilia A
appendix: exercises for people with haemophilia

This section includes examples of exercises that can be individualised and recommended for people with haemophilia. They include exercises for stretching, strength and balance/proprioception.

In addition to descriptions of each exercise, the table includes ‘comments’ on what to be aware of when carrying out the exercise, and a ‘functional application’ with suggestions about when the exercise might be useful. A detailed description of exercises for people with haemophilia has been published by the World Federation of Hemophilia.²

BEFORE STARTING ANY EXERCISE PROGRAMME, IT IS IMPORTANT THAT PEOPLE WITH HAEMOPHILIA SEEK ADVICE FROM A HEALTHCARE PROFESSIONAL²

The choice of exercises, along with details such as how often to exercise and the number of repetitions, must be tailored to the individual and their needs. Not all exercises will be suitable for all individuals with haemophilia. It is important to follow professional advice e.g.

- Do the exercises properly²
- Do not exercise into pain²
- Use clotting factor therapy before exercising if recommended by the Haemophilia Treatment Centre (particularly for people with inhibitors)²
- Ensure that the programme includes exercises for flexibility, strength and balance.²

A1 Flexibility/stretching exercises – for rehabilitation in the period after the bleed has stopped

General instructions for stretching:

- Hold in a tolerable position, feeling some tension in the muscle²
- Hold the stretch for 15–30 seconds for each repetition⁵
- Avoid bouncing (so-called ‘ballistic’) stretching as it can cause damage.⁵²

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Flexibility/stretching – Lower body

**F1 Joint: knee**
A version of this exercise is also good for strengthening muscles around the knee – see S2 on page 22.

**Basic**
Lie with the thigh supported (on a firm cushion or solid rolled towel) and the knee bent in a comfortable position. The knee is then straightened and the heel slowly lifted off the surface.

**Advanced**
For an advanced stretch, use the hands or a strap to lift the leg and extend the range of the stretch.

**Comments**
Avoid ‘locking’ the knee or ankle; do not keep the leg too rigid.
Ensure the back, particularly the lower back, is flat against the floor or bed.
Make sure the head is supported properly with a cushion to prevent strain to the neck.
If the leg is weak, the hands or a strap can also be used to assist with lifting the leg for the basic exercise.

**Functional application**
Useful where there is difficulty getting out of bed; carry out the stretching exercise in bed before rising.

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**F2 Joint: knee**
A version of this exercise is also good for strengthening muscles around the knee – see S1 on page 22.

**Basic**
Lie on the stomach and, keeping hips as flat as possible, bend the knee towards the bottom.

**Advanced**
To increase the stretch, reach back and grab the foot, gently pulling it as far as it will go towards the buttocks. If preferred, stand facing a wall or table for this exercise, balancing with one hand on the wall. Pull the foot toward the buttock while keeping the hip extended. A towel can be used as an aid to stretch.

**Comments**
Important not to overflex the knee. Use gentle pressure that feels comfortable on the front of the knee.
If lying down, try to ensure the hips both remain on the floor and do not tilt to the left or right with the weight of the leg.
For the standing version, be careful to stand up straight rather than leaning to one side or another.

**Functional application**
Good to maintain movement of the knee and to improve movement after a period of immobility (such as after a bleed or injury).
The lying-down version also stretches the hip muscles and can help improve posture.

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Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Lie in a comfortable position and move the foot up and down and in and out.

Comments
It is important to support the back in this exercise, so tilt the pelvis slightly backward, so the lower back does not become arched, and pull in the abdominal muscles.

Functional application
Useful for people who want to work on the range of motion of the knee to progress to activities such as cycling, either outside or on a stationary bike at the gym.

Having proper amounts of knee bending makes it more comfortable to sit in a stadium seat/theatre seat as well as in a car.

Flexibility/stretching – Lower body

F3 Joint: knee³

Lie or sit with both legs straight out. Bend the hip and knee and slide the heel towards the bottom and away again to a straight position in a slow, controlled movement.

Flexibility/stretching – Lower body

F4 Joint: ankle³

Lie in a comfortable position and move the foot up and down and in and out.

Comments
If it is more comfortable, lie on a bed or sofa and extend the legs over the end.

Functional application
Useful where there is difficulty getting out of bed; carry out the stretching exercise in bed before rising.

Useful where walking distance is limited because of stiffness in the ankles.

Useful after periods of prolonged sitting, to loosen up the ankle joints prior to standing and walking.

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Flexibility/stretching – Lower body

**F5 Joint: ankle**

Sit in a chair with the feet flat on the floor and slowly raise the front of the foot while keeping the heels down.

Can also be done lying or standing.

**Comments**

Sit towards the edge of the chair, in a comfortably upright position, and think about using the abdominal muscles to support the trunk. In this sitting position tilting the pelvis slightly forward will help to activate the trunk muscles.

**Functional application**

Useful where walking distance is limited because of stiffness in the ankles.

An advantage of this exercise is that it can be done at school or work, or on the train, bus or plane.

Useful after periods of prolonged sitting, to loosen up the ankle joints prior to standing and walking.

Flexibility/stretching – Upper body

**F6 Joint: shoulder**

Stand slightly closer than arms-length away from a wall. Then raise the arm to shoulder level and gently ‘walk’ the fingers up the wall as high as possible.

Hold for a few seconds, and then walk the fingers back down.

**Comments**

Be careful not to overstretcher but gradually increase how high over time.

**Functional application**

A good range of shoulder motion is useful for activities of daily living such as washing and dressing.

It also helps when reaching to retrieve and place items on a shelf or clothing in a closet.

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Flexibility/stretching – Upper body

F7 Joint: elbow³
A version of this exercise can also be used to strengthen muscles around the joint – see S5 on page 24.

Sit or lie with the elbow supported and slowly extend the elbow letting the weight of the arm assist.

Comments
Be careful not to over-flex or overextend the joint: never stretch into the straight position far enough to elicit ‘crunchiness’ or ‘grinding’ in the joint.

Functional application
A good range of elbow motion is vital to activities of daily living such as washing, dressing, eating, shaving etc.

Flexibility/stretching – Upper body

F8 Joint: wrist⁶

Hold the arm out as straight as possible. Use the other hand to gently apply pressure to the palm of the hand to pull it back.

Apply gentle pressure to the front of the hand to stretch the wrist in the opposite direction.

Comments
Do not lock the elbow while doing this stretch.

Functional application
A good range of wrist motion is vital to activities of daily living such as washing, dressing, eating, shaving etc.

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
### A2 Strengthening exercises – for longer-term rehabilitation of joints and muscles

**Strength – Lower body**

#### S1 Hamstring muscle

The prone version of this exercise also serves as a stretch for the knee joint – see **F2** on page 18.

**Basic**

lie on the stomach and bend the knee slowly through 90 degrees, then slowly lower the foot to its resting position.

**Advanced**

This exercise can be performed while standing and holding on to a wall or furniture for support.

The most advanced version involves standing and using resistance, such as an elastic band or weight attached to the ankle.

**Comments**

The standing version of this would not be recommended if there is an active problem with the ankle or if ankle pain prevents standing on one foot.

If done in a standing position, ensure that the weight is evenly spread across the ball and heel of the foot on the floor.

**Functional application**

Having a stronger hamstring muscle can assist with weight-bearing activities such as standing and walking.

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#### S2 Thigh (quadriceps) muscle

A version of this exercise – without the weights – is good for stretching the knee joint – see **F2** on page 18.

Lie on the back with a roll support under the knee. The knee to be exercised should then be extended and the heel lifted. Additional resistance can be added to the exercise by adding weights at the ankle.

**Comments**

Do not keep the leg too rigid.

Ensure that the back is flat against the floor or bed.

The head should be well supported comfortably on a pillow or cushion.

**Functional application**

Maintaining good strength in the quadriceps helps reduce the risk of injury or pain in the knee.

Quadriceps strength is needed when standing up from a seated position, and when ascending and descending steps.

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Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Elbow extension strengthening exercises can be performed at a number of different levels.

1. From a bent position, push the arm down into the other hand, holding the position for 5-10 seconds.

2. In a sitting or lying position, begin with the elbow bent (hand near the shoulder) and extend the hand towards the ceiling, straightening the elbow.

3. Weights can be added for further resistance. Start with a low weight, and combine movements with 'palm up' and 'palm down' movement.

In a standing position, lift both heels and stand on the toes.

Aim is to go straight up and down – imagine a string at the top of your head, pulling you up. Make sure the knees are kept straight and keep the speed slow and controlled.

Comments

Best done following ankle flexibility exercises.
The feet should be comfortably shoulder width apart.
Hold on to a chair or wall, or raise the arms for additional balance.

Functional application

Ankle strength is useful for numerous functional activities, including walking and climbing stairs.
This exercise can also aid improvements in balance in the ankles.

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1. From a bent position, push the arm down into the other hand, holding the position for 5-10 seconds.

2. In a sitting or lying position, begin with the elbow bent (hand near the shoulder) and extend the hand towards the ceiling, straightening the elbow.

3. Weights can be added for further resistance. Start with a low weight, and combine movements with ‘palm up’ and ‘palm down’ movement.

Comments

Avoid sustained ‘locking’ of the elbow.
Keep the shoulders relaxed and avoid tensing. Before beginning the exercise, shrug then relax the shoulders.
Keep the speed slow and steady.

Functional application

Practical applications of elbow strength include being able to push up out of a chair, open doors and carry shopping bags.
Helps with the flexibility and range of motion of the elbow joint.

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Comments
Keep the body still, and the back straight avoiding rocking back and forth. The quality of the exercise is more important than the quantity of repetitions.

Be careful not to lock the elbow when the arm is extended.

Functional application
Practical applications of elbow strength include being able to push up out of a chair, open doors and carry shopping bags.

Strength – Upper body

S5 Elbow (biceps)⁶

Basic
Start with the arm down, palm facing forward, then lift up to the shoulder and back again.

The exercise can be done in either a standing or sitting position.

Advanced
Using weight or exercise bands to increase the resistance.

S6 Elbow³

Stand facing a wall with arms as straight as possible.

Lean in towards the wall, allowing the elbows to bend. Return to upright position by pushing with arms and straightening elbows.

Comments
Avoid if there are shoulder or active elbow problems.

Start with only small amounts of bending and progress gently.

Wear non-slip shoes or bare feet to reduce the risk of slipping.

Be careful to avoid letting the stomach sag forwards, keep the lower back straight and activate the abdominal muscles.

Functional application
Practical applications of elbow strength include being able to push up out of a chair, open doors and carry shopping bags.

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
Basic
Sit supported on a chair with the forearm resting either on a table or along the arm of the chair.
Holding a small weight in the palm of the hand, alternate between palm up to palm down.

Advanced
The exercise can be progressed to starting with the forearm still supported and the hand hanging over the edge of the table. Do the exercise with the weight through the full range of movement.

Comments
Do not try to overextend the wrist.
Remember to relax the shoulders.

Functional application
Wrist strength is required for tasks such as turning a door knob, or using a kitchen spatula while cooking.

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
**Balance/joint stability exercises – for longer-term rehabilitation of joints and muscles**

**B1 Lower body**

Stand on the affected leg and attempt to maintain balance.

**Basic**
Perform the exercise first with the eyes open then closed. Progress from holding on to a chair or wall to standing unsupported.

**Advanced**
Progress to balancing on an unstable surface, such as a pillow or block of foam.

**Comments**
Start by holding on to a wall until balance improves. Start by placing weight on the ball of the foot, and then the heel, moving between these two extremes to find a point where the weight is balanced across the whole of the sole of the foot. Use with caution if there are problems with the ankle joint. Keep shoes on if it is more comfortable or orthotics are worn.

**Functional application**
Useful where balance is a problem.

**B2 Calf muscle and ankle joints**

Raise toes as high as possible so that body weight rests on the heels. Walk for around 10 feet/3m. Repeat walking on the toes.

**Comments**
May need to start by holding on to a wall when attempting this exercise until balance improves. The arms can also be raised or placed on the hips for additional balance.

**Functional application**
Maintaining good strength in the quadriceps helps reduce the risk of injury or pain in the knee.

Always consult your healthcare professional before commencing an exercise programme, including the activities described in this leaflet.
**Balance/stability**

**B3 Tandem walking**

Place one foot in front of the other so that the heel of the forward foot touches the toes of the rear foot.

Walk as if on a tightrope with the heel of one foot touching the toes of the other.

Walk for around 10 feet/3m.

**Comments**

Carry out this exercise on firm flooring e.g. without carpeting or on a low-pile carpet.

Walk next to a kitchen counter or wall if assistance is needed with maintaining balance.

If this exercise is too difficult at first, try placing each foot in front of the other with a 20cm space between them and walk in a straight line. As balance improves try and bring the feet closer together until the heel and toe are touching.

**Functional application**

Useful where balance is a problem.

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**Balance/stability**

**B4 Upper body**

**Basic**

Start with the hands and knees on the floor; knees under hips and wrists under shoulders. The back should be flat and the neck straight. Raise one leg backwards, balance should be maintained on both arms. Do not raise the leg too high; the back should not dip.

**Advanced**

Raise the affected arm and the opposite leg and maintain balance. Try to raise and lower the arm and leg at the same time. Always bring the knee and wrist back to the original position.

**Comments**

Should only be attempted if there are no active elbow, knee or shoulder problems.

Must be confident and able to get down on the floor and kneel as well as being able to get off the floor unaided.

May need to cushion the knee and under the foot if the ankle has limited plantarflexion (pointing down movement).

The exercise should be done slowly and in a controlled way.

**Functional application**

Useful for improving posture.
## Glossary of terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Analgesics</td>
<td>An analgesic (also known as a painkiller) is any member of the group of drugs used to reduce or eliminate pain.</td>
</tr>
<tr>
<td>Arthropathy</td>
<td>A disease or abnormality of a joint; haemophilic arthropathy refers to joint damage caused by repeated bleeding into a joint.</td>
</tr>
<tr>
<td>Factor replacement</td>
<td>The factors missing or deficient in haemophilia are factor VIII (haemophilia A) or factor IX (haemophilia B). These factors can be replaced using factor replacement therapy.</td>
</tr>
<tr>
<td>Haemarthrosis</td>
<td>Bleeding into a joint, most commonly a hinge joint (knee, ankle or elbow).</td>
</tr>
<tr>
<td>Ligament</td>
<td>A short band of tough, flexible, fibrous connective tissue that connects two bones or cartilages or holds together a joint.</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>A disease in which the bones become extremely porous, are subject to fracture, and heal slowly.</td>
</tr>
<tr>
<td>PRICE</td>
<td>An acronym for Protect, Rest, Ice, Compression and Elevation as a method for treating a sports-related injury or joint bleed.</td>
</tr>
<tr>
<td>Rehabilitation programme</td>
<td>A programme for restoring someone to good health.</td>
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<tr>
<td>Synovial joints</td>
<td>Joints which enable movement at the point of contact of articulating bones. These joints contain a lubricating liquid called synovial fluid.</td>
</tr>
<tr>
<td>Synovitis</td>
<td>Damage to or inflammation of the synovium, the tissue which lines the inside of joints and provides lubrication.</td>
</tr>
</tbody>
</table>

## Useful resources


references

15. Chapter 4 Management of Bleeds in All about Haemophilia - A guide for families. 2010, Canadian Hemophilia Society: Montreal, Canada.

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“let’s talk rehabilitation” is part of the TalkingJoints® programme to encourage better understanding of how short-term rehabilitation can help recover joint function after a joint bleed.