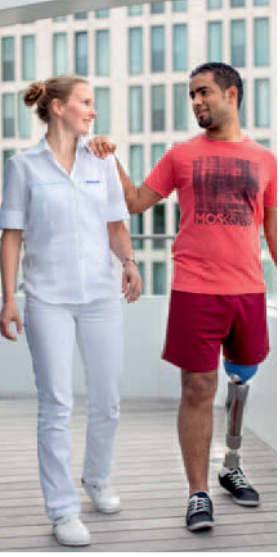


Limb POWER
Living life without limbs

SOCKET FIT AND COMFORT

A Guide for Amputees and People with Limb Difference

Picture: Ottobock

Why Socket Comfort Matters

A well-fitting prosthetic socket is essential for comfort, function, mobility, and skin health. Discomfort can lead to pain, skin damage, reducing both your ability to use your prosthesis effectively and your confidence in doing so. It's important to regularly assess your fit, the condition of your socket and equipment, and address any issues with your prosthetist.

A comfortable socket is crucial whether you're doing everyday tasks or participating in sports and fitness.

SOCKET FIT AND COMFORT

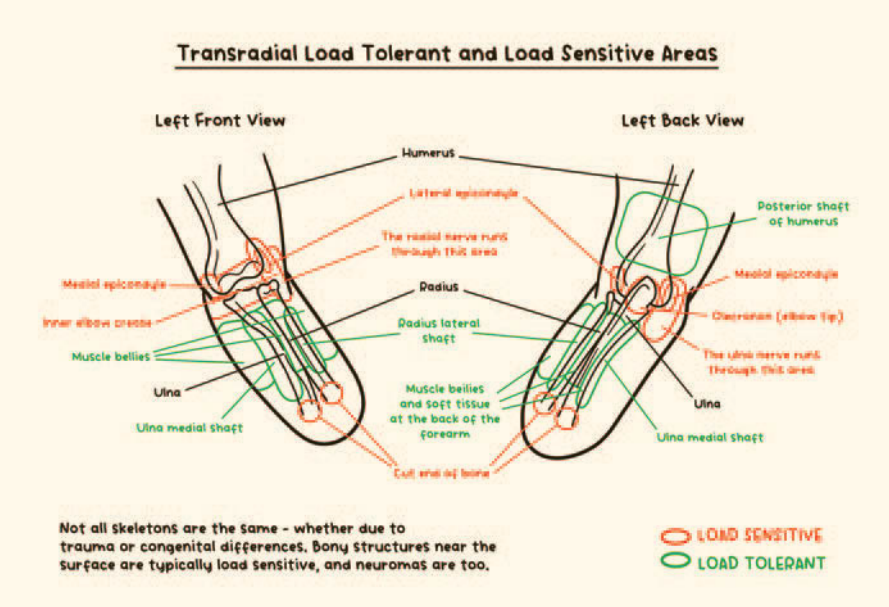
Socket fit and comfort: Key concepts

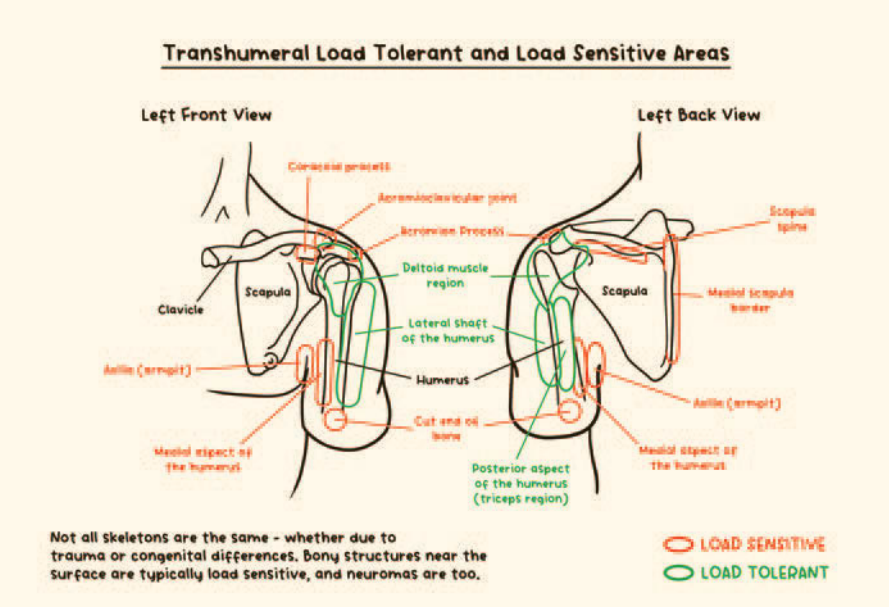
When constructing a socket, clinicians aim to:

- Load soft tissue areas to distribute pressure
- Relieve pressure over bony prominences, blood vessels, and tendons.
- Ensure alignment so forces are distributed appropriately across the limb

Poor alignment can result in:

- **Excess localised pressure and skin damage:** Excess pressure on specific areas can cause pain, soft tissue breakdown, and even ulcers.
- **Excess rotational forces:** Misalignment can cause twisting forces that lead to skin shear, joint strain, and discomfort.
- **Discomfort and pain:** Uneven pressure can lead to soreness, irritation, and skin breakdown.
- **Reduced prosthetic function:** The prosthesis may not perform properly, making movement less efficient. Activities such as walking on slopes or stairs (for lower limb users), or reaching, lifting, or pushing (for upper limb users), may become more difficult.
- **Development of compensatory movement patterns:** Misalignment can cause the body to adapt inefficient or unnatural movements to cope, potentially leading to strain or overuse in other areas.
- **Increased risk of secondary issues:** Poor alignment can contribute to joint pain, back pain, and postural problems over time.
- **Uneven weight distribution or overuse of the opposite limb:** This can





SOCKET FIT AND COMFORT

Your suspension system

cause pressure points and lead to long-term musculoskeletal strain.

Additional considerations for upper and lower limb:

For lower limb prosthesis users:

- **Instability and poor balance:** Misalignment increases the risk of falls and can make standing or walking more difficult.
- **Gait deviations:** Walking may feel unnatural, require more effort, and result in fatigue.

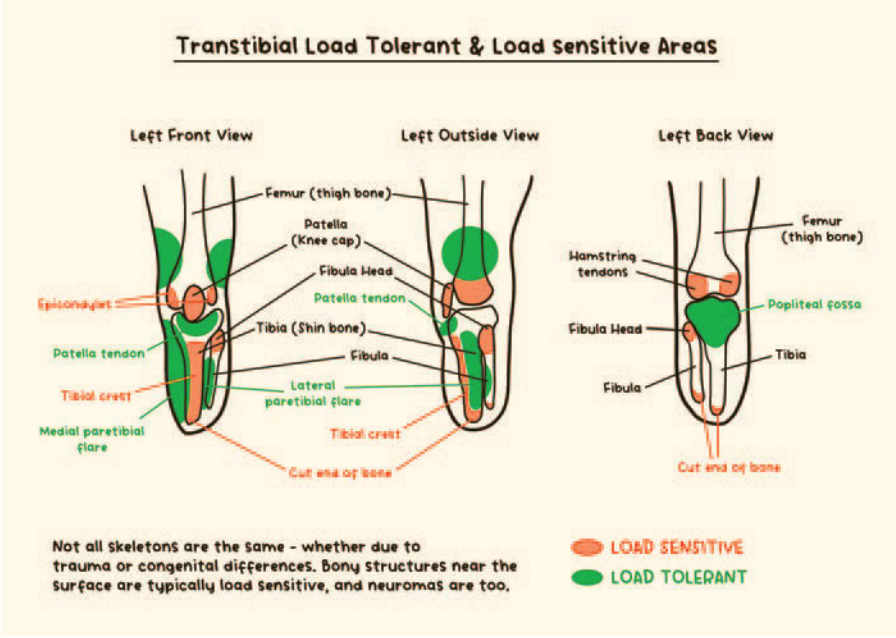
For upper limb prosthesis users:

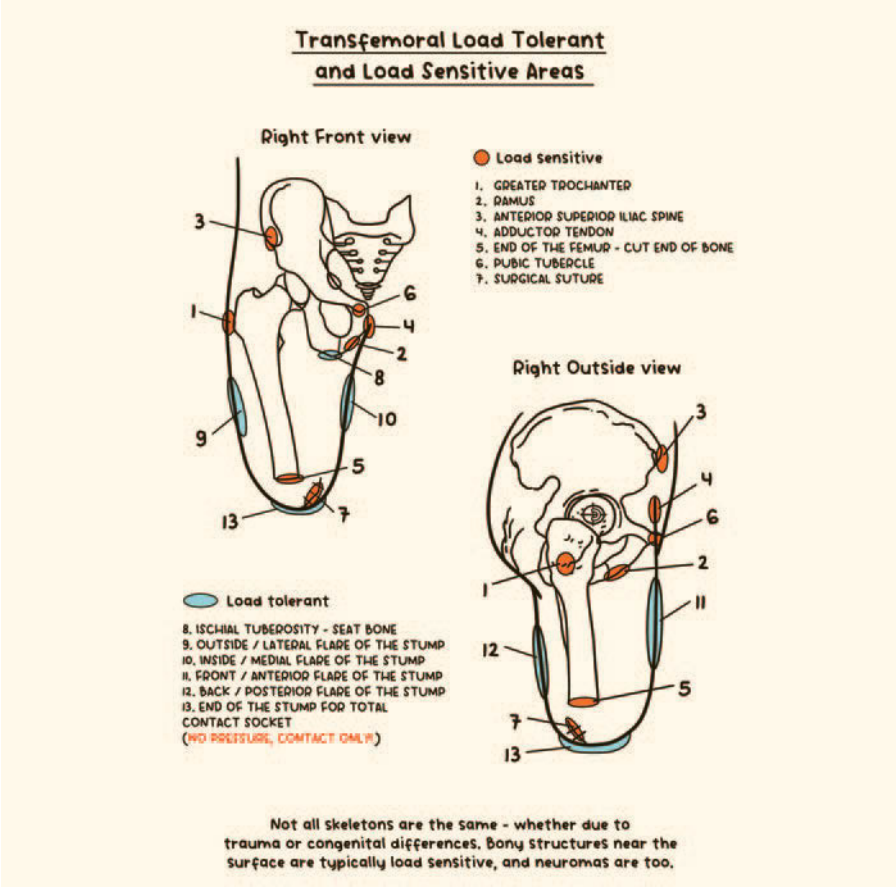
- **Reduced control and precision:** Misalignment can lead to decreased accuracy and control of the terminal device, making daily tasks harder.
- **Limited range of motion and reach:** Poor socket alignment can restrict arm or shoulder movement, affecting function and comfort during activities.

If the socket is loose, any movement will exaggerate misalignment, increasing discomfort and risk of injury.

Your suspension system and managing fit

The suspension system helps keep your prosthesis securely attached. Choosing the right system and maintaining it properly is essential for comfort and stability. The choice of suspension should be a collaborative discussion between you, your prosthetist, and your rehabilitation team. The most suitable system depends on your residual limb, your lifestyle, and your personal needs.





Managing prosthetic socks

Here are the most common types:

Common types of suspension systems (used across both upper and lower limb):

- **Anatomical suspension (also known as self-suspension)**: Uses the natural shape of your residual limb—such as bony areas—for a snug, liner-free fit. Regular reviews are needed as your limb changes over time.
- **Belts, straps, and sleeves:** These can be used as a primary or secondary suspension method. While often introduced early in rehabilitation, many use them long term due to comfort, preference, or clinical reasons. They can provide additional security alongside other systems but may require more frequent adjustment to maintain comfort and stability.
- **Pin-lock:** Provides reliable locking of the prosthesis to the liner but needs precise liner placement.
- **Suction:** Requires a good seal between the socket and the skin for a secure fit. Check regularly for air leaks, which can reduce effectiveness.

Primarily for lower limb users only:

- Va**cuum systems:** Can help maintain volume of the residual limb but requires regular maintenance.

Primarily for upper limb users only:

- **Harness suspension (body-powered):** Common in upper limb prosthetics, this system uses shoulder and back straps for control. Tension and comfort must be regularly checked to avoid rubbing or nerve issues.
- **Magnetic or mechanical couplings:** Occasionally used in upper limb prosthetics, these systems offer simple connection and disconnection using a mechanical latch or magnet. They may be helpful for individuals with limited hand dexterity but are not suitable for all users.

Signs your suspension needs attention:

- Excessive movement or "pistoning" (up-and-down movement).
- Clicking or slipping sounds.
- Using more than 3 thick socks to maintain suspension (less for upper limb users).
- Feeling like your arm or leg is "falling off".
- Holding your prosthesis to make movements or take steps.
- Your prosthesis feels heavy, drags, or rotates unexpectedly.
- Skin irritation or soreness.
- Feeling unsure or unsafe using your prosthesis.

Additional signs for upper limb prosthesis users:

- Inconsistent or unreliable control of the terminal device.
- Needing to "shoulder shrug" or shift your body position to activate movement.

Managing your suspension system:

- **Secure but not too tight:** Your suspension system should be snug but not overly tight, as this can cause discomfort.
- **Correct donning:** Ensure your prosthesis is applied properly every time. Misaligned liners or wrinkled socks can affect suspension and cause discomfort.
- **Air leaks:** If you're using a suction system, check for any air leaks that could affect the seal and cause instability.
- **Sock management:** Socks are your first line of defence for volume management. Use socks to adjust the fit of the socket throughout the day.
- **Routine checks:** Regularly inspect seals, pins, valves, or straps for wear or damage. Address any issues promptly to avoid further problems.
- **Keep components clean:** Clean your liner, socket, and suspension components regularly to maintain hygiene and proper function.
- **Axilla comfort for upper limb users:** For those with upper limb absence, the axilla (armpit) strap can often be made more comfortable. Prosthetists can provide padding and straps that can be removed daily for hygiene purposes, and they can also test different fabrics to find the most suitable for you—just ask them!

Sock and liner management

Proper management of your socks and liners is essential for adjusting fit and maintaining comfort. Throughout the day, your residual limb will change in size and shape. Adjust your socks or liners as needed to maintain a secure and comfortable fit.

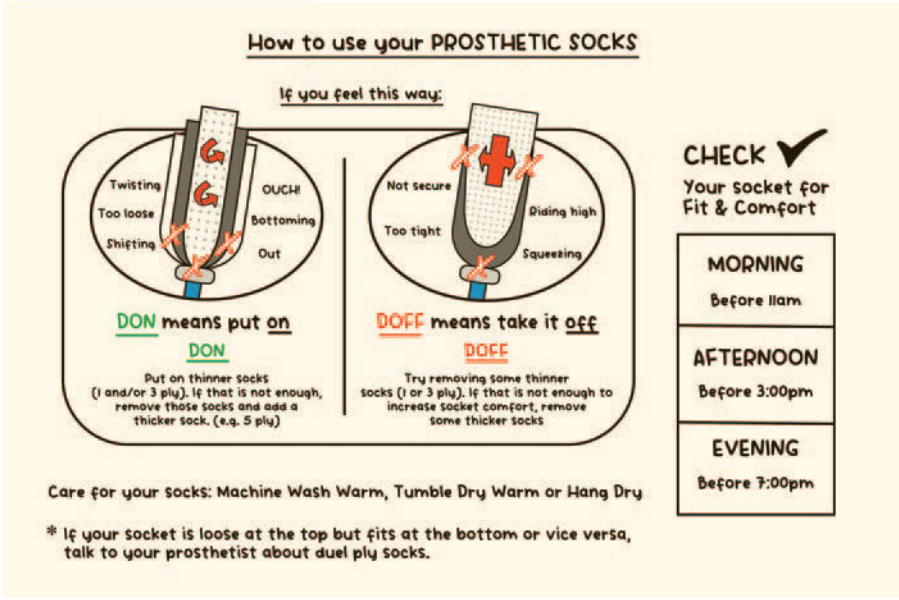
General guide for sock management (primarily for lower limb):

- Socks vary in thickness ("ply") and can be used to adjust socket fit as your residual limb volume changes throughout the day.
- The most common ply available from the NHS are 3-ply "thin" and 5-ply

RESOURCE GUIDE

SOCKET FIT AND COMFORT

Managing prosthetic socks



"thick" (they may also supply very thin 1-ply socks). Private companies may supply socks of additional thicknesses.

- If you find your socket too loose, you will be advised to progress from 1 thin sock to 2 thin socks, to 1 thick sock, etc. until the right fit is achieved.
- **0-5 ply:** Normal daily volume fluctuations, manageable with sock layering.
- **6-10 ply:** Moderate volume change; monitor closely and adjust as needed.
- **10+ ply:** Significant volume loss; may require socket adjustment or replacement.
- Wearing 3 thick socks may be normal temporarily, but if this continues, your socket may need reviewing.
- Rotate and wash socks frequently to maintain hygiene and comfort.
- Always follow your clinician's guidance on sock combinations.

Managing sock fit:

- Ensure socks are evenly layered and wrinkle-free, as folds can create pressure points.
- Carry extra socks with you throughout the day to manage volume changes.
- If your socket feels loose, try adding a sock (adjust thickness depending on need).
- If your socket feels tight, try removing a sock, or try swapping a thicker sock for a thinner one (adjust thickness depending on need). You may also take short breaks and elevate your limb to reduce swelling.
- Always check your residual limb for bruising or redness after changing sock layers. If irritation occurs, try to minimise use for the rest of the day.
- If you're using more than 10-15 ply in total (e.g. 3 thick socks or equivalent), it's time to speak to your prosthetist.

Socket fitting for new amputees

When you're ready for your first prosthesis, your clinical team will create a socket using data capture methods such as a cast, measurements or 3D scan. At this stage your residual limb may change shape rapidly – usually shrinking – which can cause sockets to become loose between appointments. This is normal and manageable but it requires attention

What to expect:

- Initial shrinkage is common. Your limb will likely lose volume quickly after surgery.
- Frequent check-ins are needed. Your socket might fit well for a week, then suddenly feel loose.
- Discomfort doesn't mean failure. Its part of the normal adjustment process – flag issues early.

New socket tips:

- Start with short wear periods and gradually increase as tolerated.
- Don't over-wear a new socket, even if it feels OK at first.
- Volume changes during healing are normal – expect several refits
- If you're unsure about wearing time or care, write down your clinicians instructions.

Frequent sock changes may be normal depending on how long since your surgery and your activity level, but it may also indicate a need for socket review.

Liners

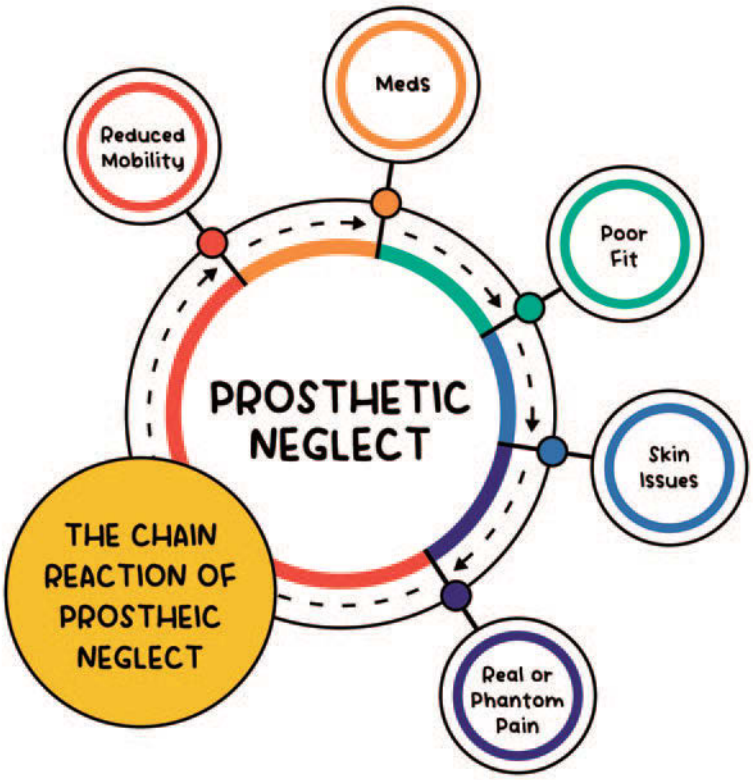
For upper limb prosthesis users:

- Sock use in upper limb prosthetics is less common but may still be recommended for volume management, particularly with self-suspending or suction-type sockets.
- Thin socks can help improve comfort or fill minor volume gaps if the socket feels loose.
- Just like with lower limb use, layering should be wrinkle-free and balanced to avoid discomfort, pressure points, or poor suspension.
- If you notice reduced control, increased rotation, or loss of stability, a review of your socket, suspension, or sock use may be needed.
- Volume changes in the upper limb are often more subtle but can still impact function – monitor fit and contact your prosthetist if issues arise.

Liners:

Liners are soft, flexible sleeves worn over the residual limb. They act as a cushion and help suspend the prosthesis in some systems.

- Liners help suspend the prosthesis and provide protection.
- They can soften the skin over time, which may reduce your ability to feel and control the prosthesis.
- They are not always clinically necessary.
- Most liners are designed to fit without socks initially, but if volume decreases, socks may be worn over the liner to adjust the fit.
- Make sure your liner is applied correctly each time—misalignment or air pockets can lead to pressure and discomfort.
- Liners are recommended for a number of reasons, but especially when skin integrity on the residual limb is a concern.



- Look after your liner: Ensure your liner is clean and in good condition to maintain hygiene and comfort. Follow your clinic's care guidelines.
- Liners wear out over time and may need regular replacement depending on use. You can discuss liner use, suitability, and care with your prosthetic team.

Common causes of socket discomfort

When your socket doesn't feel right, it's often not the socket that has changed – it's more likely to be a change in your residual limb. Despite careful adjustments, certain factors can still cause discomfort. Here are some common causes:

- **Poor socket fit:** Changes in limb volume can make the socket feel too loose or too tight.
  a. **Loose socket:** Can lead to shifting, rubbing, and skin irritation.
  b. **Tight socket:** Can cause pinching, blisters, and poor circulation.
- **Volume fluctuations:** As your residual limb changes throughout the day – due to activity, heat, or swelling – your socket may no longer fit as well. Sock and suspension adjustments are key to managing these fluctuations.
- **Change in body proportions:** As your progress through rehabilitation and return to more varied activity your body will adapt – often in positive ways. Standing taller, increased mobility or range of motion, or reduced body mass can all affect how your socket fits.
- **Incorrect donning:** Misaligned liners, wrinkled socks, or poor suspension setup can create pressure points or reduce stability.
- **Skin irritation & pressure points:** Excessive pressure—especially over

SOCKET FIT AND COMFORT

Daily checks and maintenance

bony areas—can cause skin breakdown. Rubbing, sweating, or friction may lead to redness, blisters, or sores. Regular checks can help identify issues early.

- **Sock & liner issues:** Wearing the wrong type or thickness of sock/liner can impact fit and comfort.
- **Heat & moisture:** Excess sweating can lead to skin issues and discomfort inside the socket.
- **Increased physical activity:** Higher levels of movement can increase load on your residual limb. This may increase discomfort, and any gait deviations or socket issues may also become more noticeable.
- **Socket misalignment:** Uneven pressure due to misalignment can cause pain or instability. For lower limb users, changing shoes (especially heel height) can alter alignment and socket comfort. For upper limb users, poor alignment or fit may cause difficulty controlling the terminal device or discomfort when reaching or lifting.
- **Feeling of insecurity:** Even if there are no visible issues, if your socket doesn't feel right, it may affect your confidence using it. Don't ignore this—speak to your prosthetist.

Daily checks and maintenance

There are signs to look out for when your socket is not comfortable. Always check the obvious first – something as simple as a wrinkled sock can cause a lot of pain. Recognising these signs early can prevent bigger issues. It may take some trial and error to build your confidence with sock management and find the most comfortable fit.

A regular maintenance routine ensures that your limb and prosthesis stay in good condition, preventing issues before they become problems.

Daily checks

- **Skin check:** Inspect your residual limb for signs of irritation, redness, pressure marks, bruising or sores. Also be aware of any pain, or any changes that are unusual for your limb. Promptly address any concerns to prevent further complications.
- **Socket check:** Ensure there are no foreign objects in the socket, and that it is securely in place and free of cracks or damage.
- **Suspension check:** For suction or vacuum systems, check that the seal is intact and there are no air leaks. For upper limb harness users, check strap alignment and tension daily – this can shift throughout the day.
- **Liner check:** If you wear a liner, inspect it for wear, thinning, or damage. A worn liner can affect both comfort and suspension.

Donning check

- **Donning check:** Make sure your socket, liner, or socks are applied correctly. Wrinkles, twists, or poor alignment can cause pressure points or discomfort later in the day.

Fit check

- **Is the fit feeling loose?** The residual limb feels like it's "sinking" too far into the socket.
- **For lower limb users,** does your leg feel shorter than the opposite side? Is there excessive pistoning or visible gapping at the top of the socket when standing?
- **For upper limb users,** does your prosthesis feel unstable, rotate unexpectedly, or require extra effort to control or position?
- **Is the fit feeling tight?** The residual limb feels like it's sitting too high in the socket or being "plugged out".
- **For lower limb users,** does your leg feel longer than the opposite side? Is it difficult to fully insert your limb into the socket?
- **For upper limb users**, are you experiencing increased pressure or restriction when moving? Does your prosthesis feel harder to don (put on) or control?

Gait and activity awareness & when to seek help

Limb Care and Skin Care

Proper skin care is essential for preventing irritation, blistering, and skin breakdown. Follow these guidelines to keep your skin healthy and comfortable when wearing a prosthesis.

- **Cleansing:** Wash your residual limb, socks/liner and socket regularly with mild soap and warm water, especially if you sweat heavily. Clean your liner daily following your prosthetist's or manufacturer's instructions.
- **Inspect your skin after wear:** Check your limb for pressure marks, redness, or irritation after removing your prosthesis. Redness that doesn't fade within 15–30 minutes may indicate a problem.
- **Drying:** Pat your residual limb dry gently with a soft towel. Ensure your skin, socks/liner and socket are completely dry before putting your prosthesis back on, to prevent bacteria growth and skin issues.
- **When to bathe and shower:** Consider showering at night rather than in the morning, as hot water and/or dangling your limb during showers can cause swelling, making it harder to wear your prosthesis comfortably.
- **Avoid talcum powder:** Talc can form abrasive clumps on the skin. If needed, use cornstarch as a safer alternative.
- **Maintain skin health:** Moisturize your skin daily, or as directed by your clinician to keep it soft and flexible. Barrier creams or anti-chafing products may also help reduce irritation.
- **Sun Protection:** Protect your limb from the sun by applying sunscreen (SPF 30 or higher) when exposed.
- **Posture and sleeping:** Avoid resting your limb on a pillow for long periods – particularly if you have a below-knee amputation as this can lead to contractures. Above-knee amputees should also avoid sleeping positions that affect hip and thigh muscle length.
- **At night:** As a new amputee, you may be advised to wear a shrinker at night. Always follow your clinician's instructions and for lower limb users, don your prosthesis when getting out of bed.
- **Stretching exercises:** Incorporate daily stretching exercises into your routine to help maintain flexibility and ensure you can straighten your knee and hip effectively. This contributes to comfort when walking or lying in bed.

Gait and Activity Awareness

Once your socket fits well and your suspension system is secure, it's important to pay attention to how you move – whether you're walking (for lower limb users) or performing daily tasks (for upper limb users).

- **After increased activity, review how your limb feels.** Swelling may require a different sock combination or a short break from wearing your prosthesis.
- **Monitor sweat levels and take breaks as needed to dry your residual limb** – excess moisture can cause friction and skin breakdown.

For lower limb prosthesis users:

- **Pay attention to how you walk:** Limping or discomfort may suggest that your socket needs adjusting or realigning. Limping can also be a compensatory movement due to muscle imbalances or weakness – if persistent, a physio-therapist may be able to help with gait training and strengthening exercises.
- **Test on varied terrain:** Try walking on grass, slopes, or stairs to check for comfort and stability in different environments.
- **Watch for postural changes:** Subtle shifts in posture or balance may indicate socket issues or muscle fatigue.

For upper limb prosthesis users:

- **Check how your limb feels during functional tasks,** such as lifting, carrying, or repetitive movements.
- **Watch for signs of fatigue or strain,** especially in the shoulders, neck, or opposite arm.
- **Monitor fine motor control and grip strength** throughout the day—loss of precision may indicate changes in socket fit or alignment.
- **Note changes in reach or coordination,** particularly when reaching overhead or using both arms together.

When to seek help from your prosthetist

If discomfort persists despite proper sock management, or if you experience instability, it's time to consult your prosthetist. They can assess your fit and make the necessary adjustments orrecommend alternative solutions.

Signs you should seek help:

- Discomfort or pain persists despite adjustments
- You develop blisters, pressure sores,

SOCKET FIT AND COMFORT

Socket comfort score

or skin damage
- Redness or pressure marks do not fade within 30 minutes of removing the prosthesis
- The socket feels unstable or unsafe
- You can't wear your prosthesis for extended periods
- You rely on more than 3 thick socks to maintain fit (less for upper limb users)
- Gait or posture changes dramatically, or you notice compensatory movement patterns
- Any changes to the appearance of your residual limb
- Particular movements or activities which you perform regularly cause discomfort
- There is loss of control in the hand or terminal device
- Your liner, suspension system, or socket shows signs of wear or damage
- You feel anxious or hesitant about using your prosthesis – even without obvious physical problems

How Prosthetists Assess Socket Comfort

Your prosthetist plays a key role in ensuring your socket is comfortable and functional. During an appointment, they may:
- **Check the fit & alignment** – They will assess how the socket fits your limb, looking for gaps, pressure points, or excessive movement.
- **Ask about discomfort & skin issues** – You'll be asked about any pain, redness, or irritation to identify problem areas.
- **Test limb volume & suspension** – They may measure your limb size, check for volume changes, and assess how well the prosthesis stays in place.
- **Observe Your Gait** (lower limb users) – A poorly fitting socket can affect how you walk. Prosthetists will observe your movement and make adjustments if needed.
- **Observing functional tasks** (upper limb users) – This may include lifting, carrying, reaching, or using tools.
- Reviewing range of motion with and without the prosthesis. They will check whether the socket restricts your mobility.
- **Assess postural alignment:** Your prosthetist may examine how your body's overall posture is affected by the socket fit.
- **Discuss your goals and lifestyle:** Your input is vital. Be honest about discomfort, daily routines, and activities – the more your prosthetist understands, the better they can support you.
- **Adjust the socket, liner, or components** – They may modify the socket shape, change the suspension system, or recommend different liners or socks.

Using the Socket Comfort Score (SCS)

The Prosthetic Socket Fit Comfort Score (SCS) is a validated tool used in rehabilitation to assess how well a prosthetic socket fits. It's a simple numerical scale that helps gauge your comfort, based on factors such as pressure distribution, skin issues, and limb volume changes. This tool helps prosthetists adjust and refine prosthetic sockets for better patient outcomes:

SCS Scale:
0 = Unbearable pain
10 = Perfect comfort

A score of 7 or above is generally considered good, meaning you are experiencing minimal discomfort. You may be asked to rate your comfort while standing, walking, or performing tasks throughout the day. The score can be used for both upper and lower limb users, depending on how you use your prosthesis. Your prosthetist may also track your score over time to monitor progress and fine-tune the socket fit.

Always be honest with your prosthetist – if something doesn't feel right, tell them. They won't be offended, they rely on your feedback to make adjustments that can significantly improve your comfort. Even small changes to the socket, liner, or suspension system can make a big difference.

If you're receiving a new prosthesis, follow your prosthetist's guidance on wearing it in gradually. Just like breaking in new shoes, your limb needs time to adjust. Start with shorter wear periods and build up as advised to help prevent discomfort or skin problems.

Your prosthetist is there to support you. Regular reviews and open communication help keep you comfortable, confident, and mobile.

Final Thoughts

Socket comfort is not a one-time fix – it is an ongoing process. Your limb will change, your lifestyle may evolve, and your socket may need to adapt.

Staying in tune with your body and recognising early signs of discomfort is key to maintaining long-term comfort and skin health. Every individual's experience is different, and it's okay if your journey takes time – progress looks different for everyone.

Working closely with your prosthetic team and maintaining good self-care practices will help keep you mobile, safe, and empowered in your day-to-day life. Never hesitate to reach out if something doesn't feel right – your team is there to support you.

Resources & Support

For more advice and peer support, contact LimbPower via email **info@limbpower.com** or visit our website **www.limbpower.com/resources.**

This guide is not a replacement for clinical advice. Always consult your prosthetist or rehabilitation team if you have questions or concerns.

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LimbPower exists to engage amputees and individuals with limb impairments in regular and sustained participation in physical activity, sport and the arts to improve quality of life and to aid physical, social and psychological rehabilitation. To find out more about how we can help you, visit our website.

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