

## **BK Prosthetics: Definitions and Troubleshooting**

### **Some common definitions:**

1. **Patella**- knee cap
2. **Patella tendon**- the doctor taps on this to check your knee reflexes. It is the tendon below your patella.
3. **Tibia**- the largest bone below your patella, also called the shinbone.
4. **Medial flare of tibia**- this area is on the inside portion of the tibia below your knee. This is where the tibia changes from wide to narrow.
5. **Fibula**- the small, skinny bone on the outside of your leg below your knee. The top of the fibula is the **fibula head**.
6. **Shrink**- a term used to refer to a residual limb that is decreasing in size, especially below the wide part of the knee. Shrinking of the muscles or soft tissue is especially common with a newly amputated limb.
7. **Suspension**- this refers to how a prosthesis is held onto your residual limb. Some of the most common types of suspension are:
  - e. Supracondylar (SC)
  - b. Silicone suction suspension (3S)
  - c. Cuff strap and waist belt
  - d. Suspension sleeve
  - e. Vacuum
9. **SC = Supracondylar**- *supra* means **above**, and *condylar* refers to the bone at the wide part of the knee. A prosthesis with supracondylar suspension holds onto your leg by having a snug fit above this bone on the inside of the knee.
10. **3S = Silicone Suction Suspension**- this refers to a type of prosthesis that uses a roll-on silicone sleeve with a **locking pin or plunger** on the end to

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hold the prosthesis onto your limb. The **locking pin or plunger** inserts into a locking mechanism called a **shuttle lock** that is in the bottom of the prosthetic socket.

11. **Cuff Strap and Waist Belt**- a cuff strap is a strap that is attached to the top of a below knee (BK) prosthetic socket. Because it is attached above the patella it does not allow the prosthesis to slip past the patella. The cuff strap is often used in combination with a waist belt. The waist belt helps to prevent pistoning of the prosthesis on your residual limb
12. **Piston**- if a prosthesis pistons, it is not held (suspended) properly in position on your leg. Your suspension is not adequate. Your prosthesis should be held snug to your limb and not pull away (drop down) when you walk. If there is exaggerated motion between your limb and your prosthesis when you walk this is referred to as pistoning.
13. **Ply**- a term used to signify the thickness of a prosthetic sock. One ply is approximately the thickness of a thin cotton sock. You refer to a prosthetic socket fit in terms of ply. For example, “I am wearing 5 ply with my BK prosthesis”
14. **Flexion**- this refers to the position of the knee when it moves from a straight position to a **bent position**. To kneel on the floor your **knee bends** or goes into flexion. Flexion is the opposite of extension.
15. **Extension**- this refers to the knee being in a **straight position**. A **straight position** of the knee is referred to as **full extension**. When you go from a kneeling position, with your knee bent, to a standing position, your **knee straightens** or goes into extension. Extension is the opposite of flexion
16. **Hyperextension**- this refers to the knee being **pushed backwards**, or beyond a straight position. Hyperextension of the knee is beyond full extension.
17. **Shuttle lock** (see 3S=silicone suction suspension)
18. **Plunger or locking pin** (see 3S=silicone suction suspension)

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**TROUBLESHOOTING:**

If you begin to experience discomfort, remind yourself that ***your prosthesis has not changed.*** Your body or more specifically, ***your residual limb may have undergone a physical change.***

Your prosthetic socket is designed to fit your residual limb’s unique shape. If your limb is not in the proper location in your prosthetic socket or if the shape of your residual limb has changed, it can be uncomfortable. *Oftentimes, the solution to this discomfort is to try different sock combinations. Use more or less socks until you feel comfortable.*

**When do I go to see my prosthetist?**

- If it is painful, you should see your prosthetist ASAP.
- If it is uncomfortable and **persists**, no matter what sock combinations you use, you should consider seeing your prosthetist for an adjustment.

**Problems Arising from Wearing too Many Ply of Sock OR a Tight Fit**

1. Residual limb throbs, feels constricted and choked.
2. Uncomfortable pressure on patella tendon and back of knee.
3. Uncomfortable pressure on both sides of the wide part of the knee.
4. Direct pressure from the side on the fibula head.
5. End of limb becomes weepy (moist) and red/purple in color. NOTE: this is a result of a lack of contact (touching) on the end of your residual limb.
6. Uncomfortable pressure on the inside of the knee at the top (supracondylar type prosthesis).
7. Feeling that the prosthesis is too tall.

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**Problems Arising from Not Wearing Enough Ply of Sock *OR A Loose Fit***

1. Uncomfortable pressure in these areas:
  - a. On the bottom edge of the patella
  - b. Under the fibula head
  - c. The back of the knee
  - d. Under the medial flare
  - e. The bottom of the tibia
  - f. The front end of the tibia
  - g. The bottom of the fibula
2. Prosthesis may feel tight.
3. Feeling that the prosthesis is too short

**The Heel Height of Your Shoe Makes a Difference**

*Your prosthesis was designed to be fairly straight or vertical when it is sitting in your shoe.*

1. What happens when your BK prosthesis leans forward in the new shoes you just bought? The heel height is too high. What will you notice?
  - a. When you step down with your prosthesis it will push your knee forward (**flexion**) quicker than when your prosthesis is vertical in your shoe.
  - b. You may also experience extra pressure on the front end of your tibia with each step.
  - c. You may feel extra pressure on your patella tendon.
  - d. You may feel like you are walking downhill.

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1. What happens when your **prosthesis leans backward** in the new shoes you just bought? The **heel height is too low**. What will you notice?
  - a. When you step down with your prosthesis it will push your knee backward (**hyperextension**) quicker than when your prosthesis is vertical in your shoe.
  - b. You may also experience extra pressure on the back of your knee with each step.
  - c. You may feel extra pressure on your patella tendon.
  - d. You may feel like you are walking uphill.

**Problems Arising from Poor Suspension**

1. **Pistoning** is a common problem with poor suspension. The exaggerated in and out motion of your residual limb in your prosthesis causes additional friction and shear that leads to skin chafing and blistering.
2. **Slow, laborious walking** can result from poor suspension. With each step your prosthesis pulls down and away from your residual limb and you experience “waiting on your prosthesis” before you can actually take a step with it. This may also make your prosthesis feel heavier than usual.

**Everything else feels fine except.....**

**1. I have uncomfortable pressure on both sides of the wide part of the knee.**

You probably added enough ply to make your limb feel good below the wide part of the knee, where the shrinking of your limb has created extra space. However, the wide part of the knee, being mostly bone hardly shrinks at all. So the extra socks make this area quite tight.

In this case, you need to see your prosthetist to resolve the problem.

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**2. The end of my limb is reddish/purple and moist and my socks are also moist in this area when I take my prosthesis off.**

**You may have a void or lack of contact at the very end of your prosthetic socket. This creates a vacuum effect and actually pulls the body’s fluids through the skin.**

- a. You may be wearing too many ply of sock, not allowing your limb to settle into the bottom of your prosthetic socket.
- b. The end of your limb may have shrunk, leaving a void that was not there originally. See your prosthetist to restore contact to the end of your residual limb.

**3S-Silicone Suction Suspension Prosthesis**

Because the 3S prosthesis utilizes a silicone sleeve and a locking pin there are some unique problems associated with them.

**1. Rash on residual limb**

- a. It is important to thoroughly clean the inside of your silicone liner every day with mild soap and water. Rinse out all soap residue.
- b. Daily cleaning of your liner should prevent rashes. Also, do not use any deodorant, perfume, lotion or soaps containing these ingredients on your residual limb.
- c. Make sure to roll the silicone liner gently up onto your residual limb. Do not tug or pull the top part of the liner. This could cause a rash or blisters around the upper portion of the liner.

**2. Silicone liner slips off residual limb**

- a. Your limb probably has shrunk, and you may need a smaller silicone liner. See your prosthetist.
- b. You may have excessive sweating inside the liner. Talk to your prosthetist about possible options to reduce sweating.

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**3. Locking pin (plunger) problems**

**a. Noise when walking**

1. Pin may be worn and require replacement
2. Shuttle lock may be worn and require replacement

**b. Pin sticks, difficult to disengage from shuttle lock**

1. Shuttle lock may be rusty. *Spray lightly with WD-40*
2. Shuttle lock may be clogged with dirt or residue. Blow out with compressed air.

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