

A Motor Sparing Knee Block For Knee Surgery

Proprioception

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Introduction

We have described the anatomy of the nerve supply to the knee for a new concept motor sparing knee (MSK) block. This block consists of:

- Lateral Cutaneous Nerve Thigh (LCNT)
- Intermediate Cutaneous Nerve Thigh (IMCNT)
- Infrapatellar Nerve (IPN) within Adductor Canal, which also may affect the motor nerve to Vastus Medialis Muscle
- Genicular Nerves at the superomedial, ~lateral and inferomedial corner of the knee

We aimed to test the effect on proprioception in a Pilot Study using the AccuSway Board (AccuSway™, AMTI Inc, USA)

Methods

The AccuSway Board measures movement of centre of gravity (Sway).

A baseline Romberg test (1 minute eyes open followed by one minute eyes closed in a closed feet stance) was done twice.

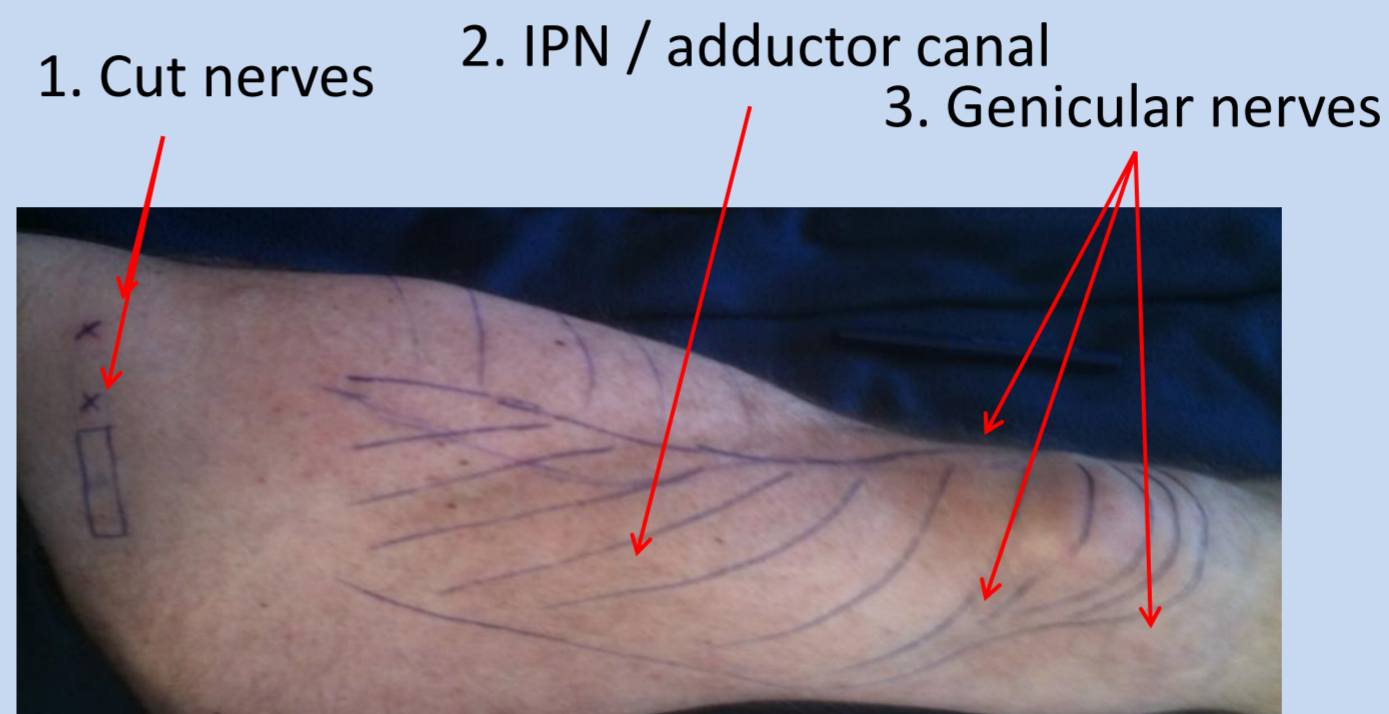
The first author then underwent a sequential US guided block of

1. LCNT and IMCNT
2. IPN/Adductor Canal
3. Genicular nerves

using 3 ml (LCNT/IMCNT) and 5 ml (IPN, GN) 0.5 % Levobupivacaine to the left leg.

Onset of block was ascertained by loss of sensation in the respective nerve territories and 20 minutes following Genicular Nerve blocks. After each block Romberg test was repeated twice.

For analysis the average of each of the two tests was taken.



Results

- Romberg test revealed no increase of Sway after cutaneous or IPN block. Sway increased after genicular block in all directions.
- Overall Centre of Gravity moved from baseline towards the left, blocked leg.
- Clinically, no motor block was evident.

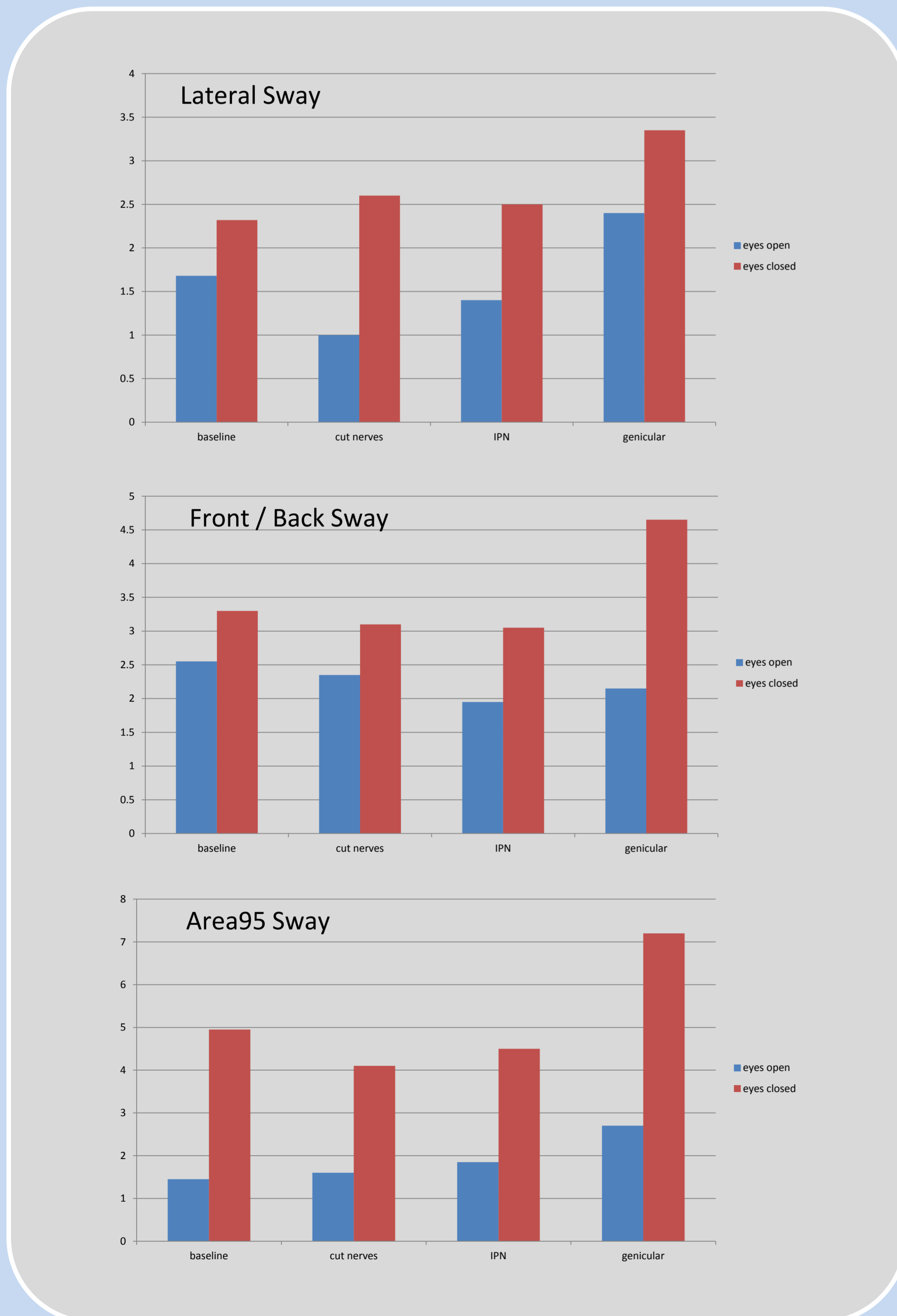


Fig 1-3: Body sway during Romberg test (average of 2 tests each) with sequential nerve blocks

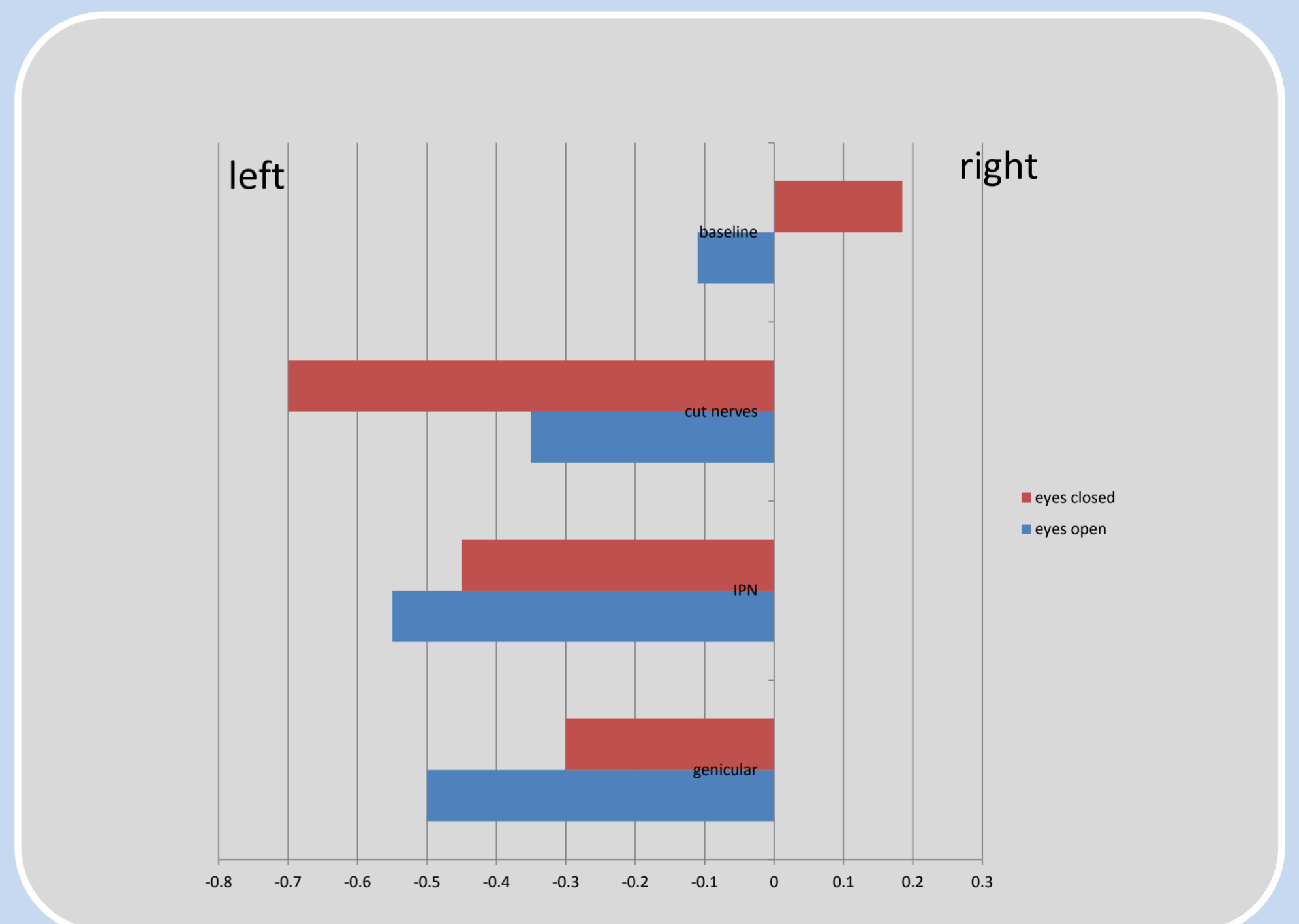


Fig 4: Lateral Movement of Centre of Gravity.

Discussion

- These results suggest that only genicular nerve blocks affect proprioception, causing an increase of Sway during Romberg test.
- Adductor Canal Block may cause weakness of Vastus Medialis Muscle. This may be detectable as the centre of gravity would be expected to move towards the unblocked leg. This was not the case. It is however possible that in healthy volunteers weakness of the vastus medialis muscle can be compensated by the remaining quadriceps function.
- It is recognised that patients undergoing knee arthroplasty surgery have reduced quadriceps function and therefore may have more significant weakness after adductor canal block.

Conclusion

Proprioception is diminished after genicular nerve blocks as would be expected, but motor function appears unaffected in healthy volunteers undergoing our Motor Sparing Knee Block.