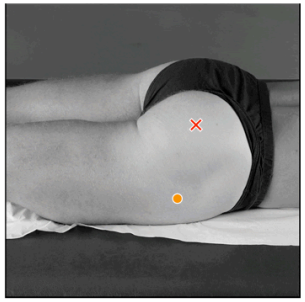
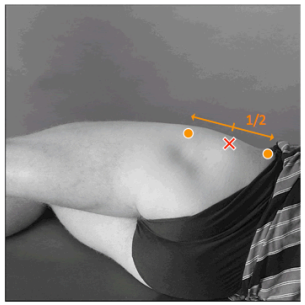
01. GM – Gluteus maximus



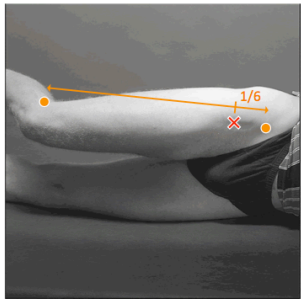
Electrode placement	
Posture	Prone position, lying down on a table.
Location	1/2 on the line between the sacral vertebrae and the greater trochanter. This position corresponds with the greatest prominence of the middle of the buttocks well above the visible bulge of the greater trochanter.
Orientation	In the direction of the line from the posterior superior iliac spine to the middle of the posterior aspect of the thigh
Test	Lifting the complete leg against manual resistance.
Remarks	

02. GMed – Gluteus medius

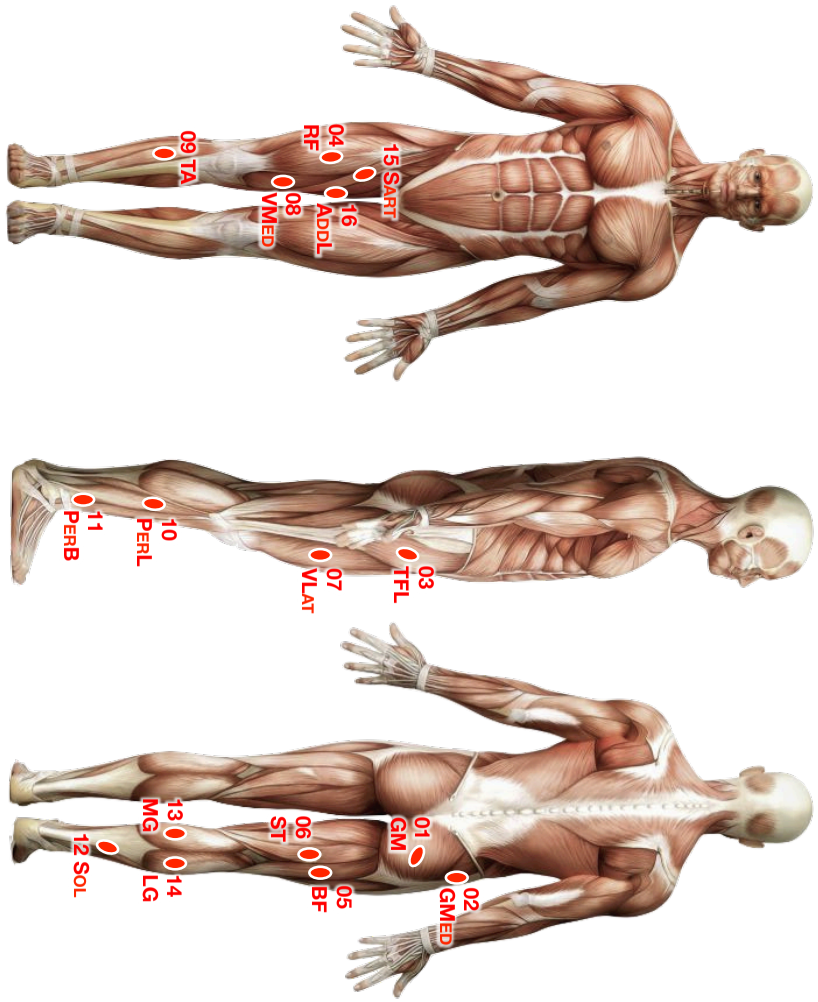


Electrode placement	
Posture	Lying on the side on a table.
Location	1/2 on the line from the crista iliaca to the trochanter.
Orientation	In the direction of the line from the crista iliaca to the trochanter.
Test	Lying on the side with the legs spread against manual resistance (holding the ankles).
Remarks	

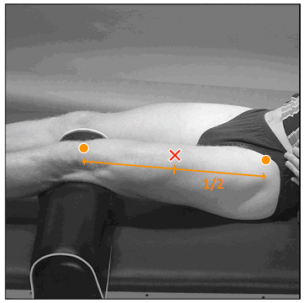
03. TFL – Tensor fasciae latae



Electrode placement	
Posture	Lying on the side on a table.
Location	1/6 on the line from the anterior spina iliaca superior to the lateral femoral condyle.
Orientation	In the direction of the line from the anterior spina iliaca superior to the lateral femoral condyle.
Test	Lift and abduct the leg against manual resistance.
Remarks	

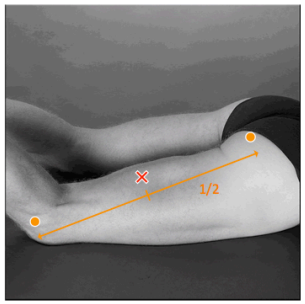


04. RF – Quadriceps femoris, rectus femoris



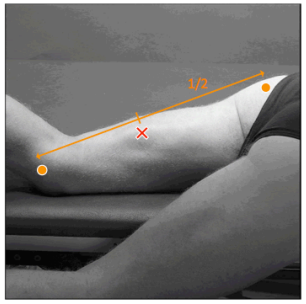
Electrode placement	
Posture	Sitting on a table with the knees in slight flexion and the upper body slightly bend backward.
Location	1/2 on the line from the anterior spina iliaca superior to the superior part of the patella.
Orientation	In the direction of the line from the anterior spina iliaca superior to the superior part of the patella.
Test	Extend the knee without rotating the thigh while applying pressure against the leg above the ankle in the direction of flexion.
Remarks	

05. BF – Biceps femoris



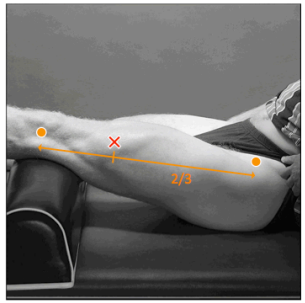
Electrode placement	
Posture	Lying on the belly with the face down with the thigh down on the table and the knees flexed (to less than 90 degrees) with the thigh in slight lateral rotation and the leg in slight lateral rotation with respect to the thigh.
Location	1/2 on the line between the ischial tuberosity and the lateral epicondyle of the tibia.
Orientation	In the direction of the line between the ischial tuberosity and the lateral epicondyle of the tibia.
Test	Press against the leg proximal to the ankle in the direction of knee extension.
Remarks	

06. ST - Semitendinosus



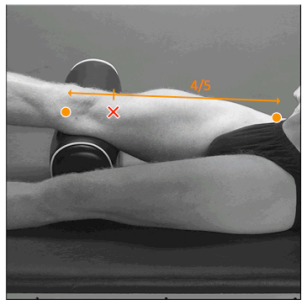
Electrode placement	
Posture	Lying on the belly with the face down and the thigh held down on the table, in medial rotation, and the leg medially rotated with respect to the thigh. The knee needs to be flexed to less than 90 degrees.
Location	1/2 on the line between the ischial tuberosity and the medial epycondyle of the tibia.
Orientation	In the direction of the line between the ischial tuberosity and the medial epycondyle of the tibia.
Test	Press against the leg proximal to the ankle in the direction of knee extension.
Remarks	

07. VLat – Quadriceps femoris, vastus lateralis



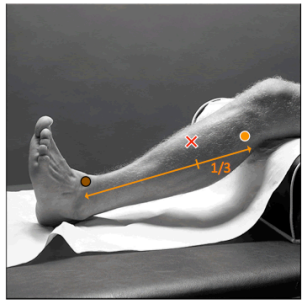
Electrode placement	
Posture	Sitting on a table with the knees in slight flexion and the upper body slightly bend backward.
Location	2/3 on the line from the anterior spina iliaca superior to the lateral side of the patella.
Orientation	In the direction of the muscle fibres
Test	Extend the knee without rotating the thigh while applying pressure against the leg above the ankle in the direction of flexion.
Remarks	

08. VMed – Quadriceps femoris, vastus medialis



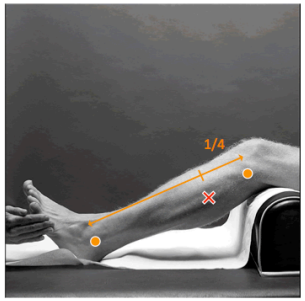
Electrode placement	
Posture	Sitting on a table with the knees in slight flexion and the upper body slightly bend backward.
Location	4/5 on the line between the anterior spina iliaca superior and the joint space in front of the anterior border of the medial ligament.
Orientation	Almost perpendicular to the line between the anterior spina iliaca superior and the joint space in front of the anterior border of the medial ligament.
Test	Extend the knee without rotating the thigh while applying pressure against the leg above the ankle in the direction of flexion.
Remarks	

09. TA – Tibialis anterior



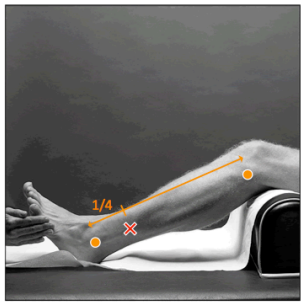
Electrode placement	
Posture	Supine or sitting.
Location	1/3 on the line between the tip of the fibula and the tip of the medial malleolus.
Orientation	In the direction of the line between the tip of the fibula and the tip of the medial malleolus.
Test	Support the leg just above the ankle joint with the ankle joint in dorsiflexion and the foot in inversion without extension of the great toe. Apply pressure against the medial side, dorsal surface of the foot in the direction of plantar flexion of the ankle joint and eversion of the foot.
Remarks	

10. PerL – Peroneus longus



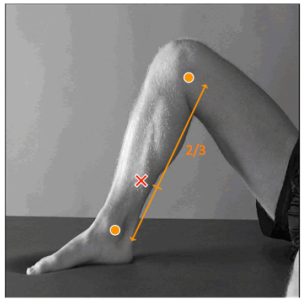
Electrode placement	
Posture	Sitting with extremity medially rotated.
Location	1/4 on the line between the tip of the head of the fibula to the tip of the lateral malleolus.
Orientation	In the direction of the line between the tip of the head of the fibula to the tip of the lateral malleolus.
Test	Support the leg above the ankle joint. Everse the foot with plantar flexion of the ankle joint while applying pressure against the lateral border and sole of the foot, in the direction of inversion of the foot and dorsiflexion of the ankle joint.
Remarks	

11. PerB – Peroneus brevis



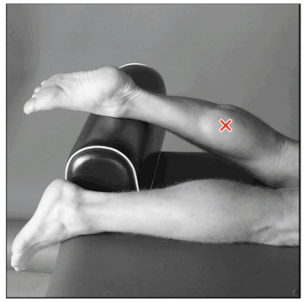
Electrode placement	
Posture	Sitting with extremity medially rotated.
Location	placed anterior to the tendon of the peroneus longus at 1/4 of the line from the tip of the lateral malleolus to the fibula-head.
Orientation	In the direction of the line from the tip of the lateral malleolus to the fibula-head.
Test	Support the leg above the ankle joint. Everse the foot with plantar flexion of the ankle joint while applying pressure against the lateral border and sole of the foot, in the direction of inversion of the foot and dorsiflexion of the ankle joint.
Remarks	It is difficult to access the peroneus brevis muscle from the surface since it is mainly covered by other muscles. Avoid crosstalk / overlap from the extensor digitorum lateralis muscle.

12. Sol - Soleus



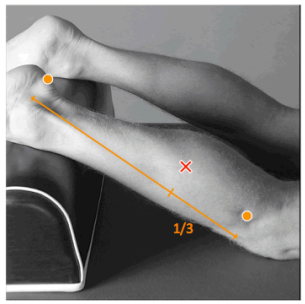
Electrode placement	
Posture	Sitting with the knee approximately 90 degrees flexed and the heel / foot of the investigated leg on the floor.
Location	2/3 of the line between the medial condylis of the femur to the medial malleolus.
Orientation	In the direction of the line between the medial condylis to the medial malleolus.
Test	Put a hand on the knee and keep / push the knee downward while asking the subject / patient to lift the heel from the floor.
Remarks	

13. MG – Gastrocnemius medialis



Electrode placement	
Posture	Lying on the belly with the face down, the knee extended and the foot projecting over the end of the table.
Location	placed on the most prominent bulge of the muscle.
Orientation	In the direction of the leg.
Test	Plantar flexion of the foot with emphasis on pulling the heel upward more than pushing the forefoot downward. For maximum pressure in this position it is necessary to apply pressure against the forefoot as well as against the calcaneus.
Remarks	

14. LG – Gastrocnemius lateralis



Electrode placement	
Posture	Lying on the belly with the face down, the knee extended and the foot projecting over the end of the table.
Location	1/3 of the line between the head of the fibula and the heel.
Orientation	In the direction of the line between the head of the fibula and the heel.
Test	Plantar flexion of the foot with emphasis on pulling the heel upward more than pushing the forefoot downward. For maximum pressure in this position it is necessary to apply pressure against the forefoot as well as against the calcaneus.
Remarks	

General remarks

Electrodes placement	
Distance	20mm between the electrodes.
Fixation	(Double sided) tape / rings or elastic band.
Reference	On / around the ankle or the proc. spin. of C7.

Reference:

Pictures and texts are direct copy-paste from the SENIAM website [www.seniam.org, visited on the 24th of March, 2014]. Signs indicating anatomical landmarks and EMG electrode positions were modified for a clearer view.

The SENIAM project (Surface ElectroMyoGraphy for the Non-Invasive Assessment of Muscles) is a European concerted action in the Biomedical Health and Research Program (BIOMED II) of the European Union. The SENIAM project has resulted in European recommendations for sensors and sensor placement procedures and signal processing methods for SEMG, a set of simulation models for education and testing, a set of test signals, eight books, publications and a European network for SEMG.