

Understanding Basic Rehabilitation Techniques



Assessing Muscle Strength Practical Workbook

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Observational and Reflective Checklist ¹

Observation		Yes / No	Comments
Introduction and Preparation for the Skill	Was the treatment area properly prepared for the patient ? e.g. pillows, safe environment etc.		
	Did the therapist introduce themselves?		
	Was the patient comfortable		
	Was the patient adequately exposed or draped?		
	Was an explanation for the procedure given?		
	Was the explanation clear and succinct?		
	Was consent obtained?		
Performing the Skill	Was the Plinth set at the right height?		
	Was the therapist's posture compromised?		
	Did the therapist identify the joint and other relevant bony landmarks?		
	Was the Measurement Tool aligned correctly? e.g. goniometer, tape measure		
	Was the measurement reading accurate?		
	Did the therapist compare both sides of the body?		
Safe and Effective Performance of Technique	Was the procedure carried out with due care and attention?		
How would you rate the proficiency in the overall performance of the skill?	Excellent		
	Very Good		
	Good		
	Satisfactory		
	Borderline		
	Fail		

Manual Muscle Testing

Application of Muscle Grades

As grades for manual muscle testing (MMT) are defined in relation to both the full available active range of motion (AROM) and gravity, the position of the patient will need to be modified in order to assign the correct grade.

Remember the following key points as you progress through your muscle strength assessment.

1. Always start manual muscle testing in a position with gravity resistance to screen whether the patient can move through the full available active range of motion (AROM) against gravity.
2. If a patient can move through full available AROM against gravity then proceed with testing in this position.
3. If a patient cannot move through full available AROM against gravity, reposition the patient so the resistance of gravity is minimised. In this case, it may be necessary to support the weight of the limb during testing

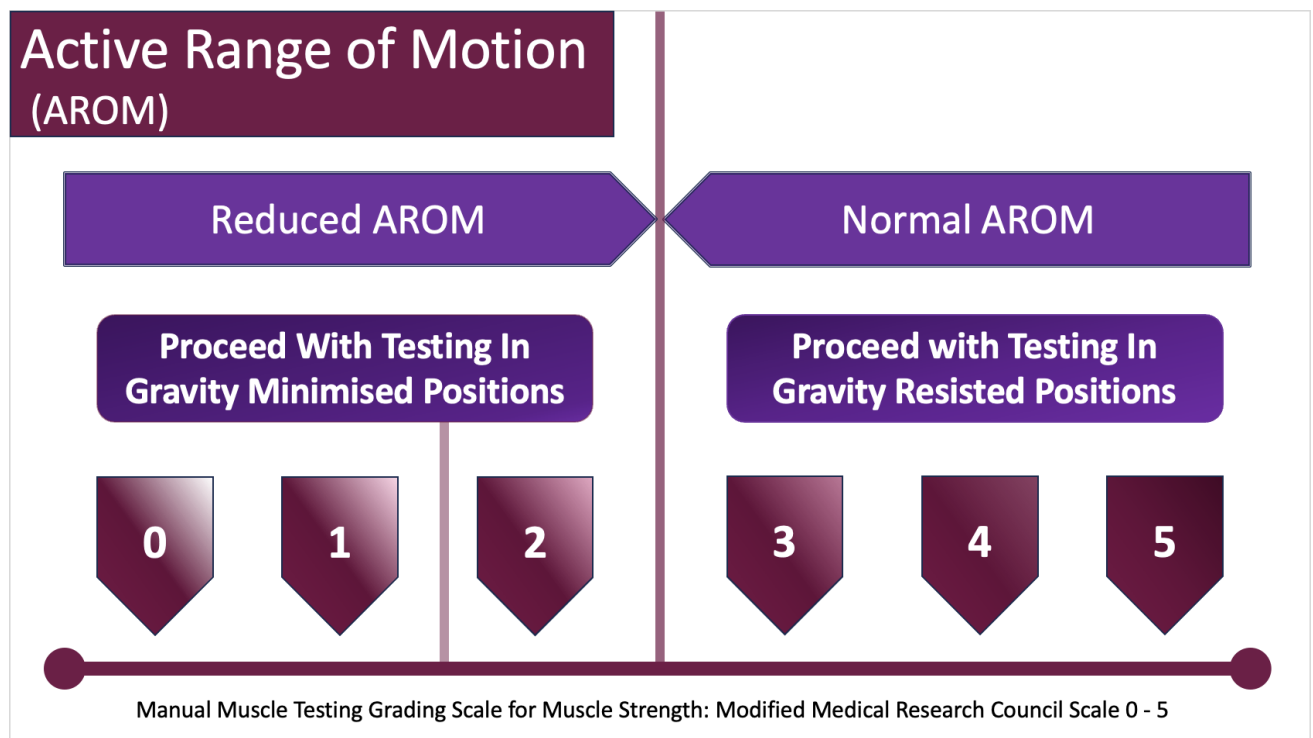


Figure.1 Determining Correct Position for Testing of Muscle Grades

The following table shows the most commonly used scale for MMT, the Modified Medical Research Council Scale.

Table. 1 Modified Medical Research Council Scale (Oxford Scale)¹

Grade	Description
0	No contraction
1	Flickering contraction
2	Full range of motion with gravity eliminated*
3	Full range of motion against gravity
4	Full range of motion against gravity with minimal resistance
5	Full range of motion against gravity with maximal resistance

Upper Limb Manual Muscle Testing

Patient Positioning ¹

Body Region	Muscle Action	Patient Position in Relation to Grade Being Tested		
		Grade 0 and 1	Grade 2	Grade 3, 4 and 5
Shoulder	Extension	Prone	Side Lying	Prone
	Flexion	Supine	Side Lying	Supine
	Abduction	Supine	Supine	Side Lying or Standing
	Adduction	Supine	Supine	Side Lying or Standing
	External Rotation	Prone	Supine	Sitting Hips and Knees at 90°
	Internal Rotation	Supine	Supine	Sitting Hips and Knees at 90°
Elbow	Extension	Prone	Side Lying or Sitting	Prone or Sitting
	Flexion	Supine	Side Lying or Sitting	Supine or Sitting
	Supination	Supine or Sitting	Difficult to eliminate gravity in full range of motion (FROM)	Supine or Sitting
	Pronation	Supine or Sitting	Difficult to eliminate gravity in FROM	Supine or Sitting
Wrist	Extension	Supine or Sitting	Supine or Sitting Forearm in Neutral	Supine or Sitting Forearm Pronated
	Flexion	Supine or Sitting	Supine or Sitting Forearm in Neutral	Supine or Sitting Forearm Supinated
	Ulnar Deviation	Supine or Sitting	Supine or Sitting Forearm Pronated	Supine or Sitting Forearm Pronated
	Radial Deviation	Supine or Sitting	Supine or Sitting Forearm Pronated	Supine or Sitting Forearm in Neutral

Shoulder Flexion



Figure.2 Shoulder Flexion Gravity Resisted Test Position

Anatomical Information ²		
Nerve Innervation	C5, C6, C7	
Primary Muscles	Deltoid (Anterior), Coracobrachialis	
Other Muscles Involved	Pectoralis Major, Deltoid (Middle), Serratus Anterior	
Gravity Resisted Position ^{1, 2, 3}		
Patient Position	Sitting with forearm in neutral with thumb pointing up towards the ceiling	
Therapist Position	Stand beside the patient on the same side as the arm being tested.	
Stabilisation	Stabilise the trunk proximal to the shoulder being tested to minimise trunk movement.	
Patient Instruction	“Raise your arm as far as you can go towards the ceiling.” If a patient demonstrates full range of motion then ask them to; “Raise your arm to shoulder level. Hold and don’t let me move your arm”	
Test Motion	Patient flexes the shoulder to 90°. Apply resistance just above the elbow in a downward direction.	
Clinical Tips	Minimise rotation or horizontal adduction or abduction of the shoulder and trunk motion.	
Gravity Minimised Position ^{1, 2, 3}		
Patient Position	Side Lying with test arm uppermost with palm facing to floor and arm supported by therapist.	
Therapist Position	Stand in front of the patient towards their head and beside their shoulder.	
Stabilisation	Support the arm at the elbow and wrist taking the weight of the arm maintaining the shoulder in neutral rotation and elbow in extension.	
Patient Instruction	“Move your hand over your head as far as you can go.”	
Test Motion	Start at 0° flexion the patient flexes their shoulder through the full available range of motion.	
Clinical Tips	Therapist should only provide support for the weight of the arm, ensuring the patient complete the motion independently.	
Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

Elbow Flexion



Figure.3 Elbow Flexion Gravity Resisted Position

Anatomical Information ²		
Nerve Innervation	C5, C6	
Primary Muscles	Biceps Brachii, Brachialis, Brachioradialis	
Other Muscles Involved	Pronator Teres, Extensor Carpi Radialis Longus, Flexor Carpi Radialis, Flexor Carpi Ulnaris	
Gravity Resisted Position ^{1, 2, 3}		
Patient Position	Sit with shoulder in neutral with elbow flexion and forearm supination	
Therapist Position	Stand or sit facing the patient on the same side as the arm being tested.	
Stabilisation	Stabilise the shoulder being tested to minimise trunk movement.	
Patient Instruction	“Bend your elbow as far as you can towards your shoulder.” If a patient demonstrates full range of motion then ask them to; “Raise your arm towards your shoulder. Hold and don’t let me move your arm”	
Test Motion	Patient flexes the elbow to 90°. Apply resistance just above the wrist in a downward direction.	
Clinical Tips	Minimise rotation of the shoulder, pronation of the forearm and trunk motion.	
Gravity Minimised Position ^{1, 2, 3}		
Patient Position	Sit with test arm supported with shoulder in 90° abduction, elbow extended and neutral forearm	
Therapist Position	Stand behind the patient on the same side as the arm to be tested.	
Stabilisation	Support arm at the forearm and upper arm just above the elbow taking the weight of the arm.	
Patient Instruction	“Bend your elbow as far as you can towards your shoulder.”	
Test Motion	Start at 0° flexion the patient flexes their shoulder through the full available range of motion.	
Clinical Tips	Therapist should only provide support for the weight of the arm, ensuring the patient complete the motion independently.	
Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

Wrist Flexion



Figure.4 Wrist Flexion Gravity Resisted Position

Anatomical Information ²		
Nerve Innervation	C6, C7, C8	
Primary Muscles	Flexor Carpi Radialis and Flexor Carpi Ulnaris	
Other Muscles Involved	Palmaris Longus, Flexor Digitorum Superficialis & Profundus, Flexor & Abductor Pollicis Longus	
Gravity Resisted Position ^{1, 2, 3}		
Patient Position	Sit with forearm supported on plinth in supination with their wrist in neutral or slightly extended.	
Therapist Position	Stand or sit beside the patient on the same side as the arm being tested.	
Stabilisation	Stabilise at the forearm to minimise elbow flexion , pronation or supination of the forearm.	
Patient Instruction	“Bend your wrist and move your hand toward the ceiling as far as you can go.” If a patient demonstrates full range of motion then ask them to; “Hold and don’t let me move your hand”	
Test Motion	Patient flexes the wrist through a full range of motion. Apply resistance evenly across the palm in a downward direction.	
Gravity Minimised Position ^{1, 2, 3}		
Patient Position	Sit with test arm supported on a plinth with 90° elbow flexion and forearm and wrist in neutral.	
Therapist Position	Stand or sit beside the patient on the same side as the arm to be tested.	
Stabilisation	Stabilise at the forearm to minimise shoulder rotation and pronation or supination of the forearm.	
Patient Instruction	“Bend your hand in towards your body as far as you can go.”	
Test Motion	Start at 0° flexion the patient flexes their wrist through the full available range of motion.	
Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

Wrist Extension



Figure.5 Wrist Extension Gravity Resisted Test Position



Figure.6 Wrist Extension Gravity Minimised Test Position

Anatomical Information ²

Nerve Innervation	C6, C7, C8
Primary Muscles	Extensor Carpi Radialis Longus, Extensor Carpi Radialis Brevis and Extensor Carpi Ulnaris
Other Muscles Involved	Extensor Digitorum, Extensor Digiti Minimi and Extensor Indicis

Gravity Resisted Position ^{1, 2, 3}

Patient Position	Sit with forearm supported in full pronation with wrist in neutral or slightly flexed.
Therapist Position	Stand or sit beside the patient on the same side as the arm being tested.
Stabilisation	Stabilise at the forearm to minimise elbow flexion, or supination of the forearm.
Patient Instruction	“Bend your wrist and move your hand toward the ceiling as far as you can go.” If a patient demonstrates full range of motion then ask them to; “Hold and don’t let me move your hand”
Test Motion	Patient extends the wrist through a full range of motion. Apply resistance evenly across the dorsal aspect of the hand in a downward direction.

Gravity Minimised Position ^{1, 2, 3}

Patient Position	Sit with test arm supported on a plinth with 90° elbow flexion and forearm and wrist in neutral.
Therapist Position	Stand or sit in front of the patient on the same side as the arm to be tested.
Stabilisation	Stabilise at the forearm to minimise shoulder rotation and pronation or supination of the forearm.
Patient Instruction	“Bend your hand out away from your body as far as you can go.”
Test Motion	Start at 0° flexion the patient extends their wrist through the full available range of motion.

Practice Results

	Measurement 1:	Measurement 2:
Right		
Left		

Lower Limb Manual Muscle Testing

Patient Positioning ¹

Body Region	Muscle Action	Patient Position in Relation to Grade Being Tested		
		Grade 0 and 1	Grade 2	Grade 3, 4 and 5
Hip	Extension	Prone	Side Lying	Prone
	Flexion	Supine	Side Lying	Supine
	Abduction	Supine	Supine	Side Lying or Standing
	Adduction	Supine	Supine	Side Lying or Standing
	External Rotation	Prone	Supine	Sitting Hips and Knees at 90°
	Internal Rotation	Supine	Supine	Sitting Hips and Knees at 90°
Knee	Extension	Supine	Side Lying	Sitting
	Flexion	Prone	Side Lying	Prone or Standing
Ankle	Plantarflexion	Prone	Side Lying	Prone or Standing
	Dorsiflexion	Supine	Side Lying	Supine or Sitting
	Eversion	Supine	Supine	Side Lying
	Inversion	Supine	Supine	Side Lying

Hip Flexion



Figure.7 Hip Flexion Gravity Resisted Test Position

Anatomical Information ²		
Nerve Innervation	L2, L3	
Primary Muscles	Iliopsoas (Psoas Major and Iliacus), Rectus Femoris, Sartorius, Pectineus	
Other Muscles Involved	Rectus Femoris, Sartorius, Tensor Fascia Latae, Pectinues, Adductors, Gluteus Medius	
Gravity Resisted Position ^{1, 2, 3}		
Patient Position	Lying in supine with hip and knee extended or Sitting on the plinth with legs hanging. Patient can support themselves with their hands on the table.	
Therapist Position	Supine: Stand behind the patient at the level of the hip Sitting: Stand in front of the patient on the same side as the leg being tested.	
Stabilisation	Stabilise at the shoulder to minimise trunk flexion or extension.	
Patient Instruction	“Raise your leg up off the table toward the ceiling as far as you can go.” If a patient demonstrates full range of motion ask them to ; “Hold and don’t let me move your your leg”	
Test Motion	Patient flexes the hip through a full range of motion. Apply resistance on the thigh just above the knee in a downward direction.	
Gravity Minimised Position ^{1, 2, 3}		
Patient Position	Side lying with test leg uppermost and supported by therapist with hip and knee in extension.	
Therapist Position	Standing behind the patient at the level of the hip.	
Stabilisation	Support the leg and thigh to maintain hip in neutral abduction.	
Patient Instruction	“Bend your knee in towards your chest.”	
Test Motion	Start at 0° flexion the patient flexes the hip through the full available range of motion.	
Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

Hip Extension



Figure.8 Hip Extension Gravity Resisted Test Position

Anatomical Information ²		
Nerve Innervation	L5, S1, S2	
Key Muscles Involved	Gluteus Maximus and Hamstrings (Semitendinosous, Semimembraneosous, Biceps Femoris)	
Other Muscles Involved	Adductor Magnus and Gluteus Medius	
Gravity Resisted Position ^{1, 2, 3}		
Patient Position	Prone with hip in neutral and knee flexed to 90° or in full extension..	
Therapist Position	Stand on the same side as the leg being tested.	
Stabilisation	Stabilise the patient's pelvis to minimise trunk extension.	
Patient Instruction	“Lift your leg toward the ceiling as far as you can go.” If a patient demonstrates full range of motion then ask them to; “Hold and don’t let me move your hand”	
Test Motion	Patient extends the hip through a full range of motion. Apply resistance on the posterior leg just above the knee in a downward direction.	
Clinical Tip	Monitor the trunk to ensure the patient does not use trunk extension.	
Gravity Minimised Position ^{1, 2, 3}		
Patient Position	Side lying with test leg uppermost with hip in neutral and 90° knee flexion.	
Therapist Position	Stand behind the leg to be tested around hip level.	
Stabilisation	Stabilise the patient's pelvis to minimise trunk extension.	
Patient Instruction	“Move your leg back towards me.”	
Test Motion	Start at 0° extension the patient extends the hip through the full available range of motion.	
Clinical Tip	Monitor the trunk to ensure the patient does not use trunk extension.	
Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

Hip Abduction

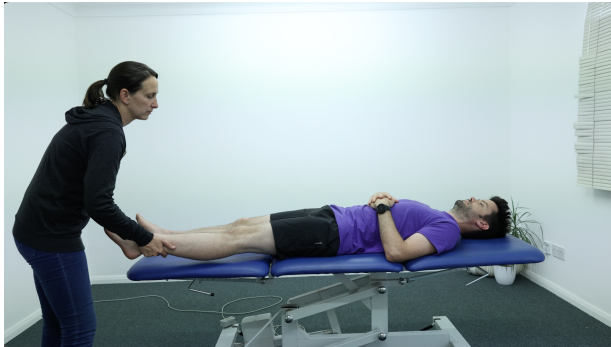


Figure.9 Hip Abduction Gravity Minimised Position

Anatomical Information ²	
Nerve Innervation	L5, S1, S2
Primary Muscles	Gluteus Medius, Gluteus Minimus
Other Muscles Involved	Gluteus Maximus, Tensor Fascia Latae, Obturator Internus, Gemellus Superior & Inferior, Sartorius

Gravity Resisted Position ^{1, 2, 3}	
Patient Position	Side lying with test leg uppermost with hip in slight extension and external rotation and knee extension. The lower leg should be flexed at the hip and knee for stability.
Therapist Position	Stand behind the patient at the level of the hip.
Stabilisation	Stabilise the patient's pelvis.
Patient Instruction	“Raise your leg up toward the ceiling as far as you can go.” If a patient demonstrates full range of motion ask them to ; “Hold and don't let me move your your leg”
Test Motion	Patient abducts the hip through a full range of motion without flexing or rotating at the hip.. Apply resistance on the thigh just above the knee in a downward direction.
Clinical Tip	Monitor for any rotation of the pelvis and prevent the patient from rocking back.

Gravity Minimised Position ^{1, 2, 3}	
Patient Position	Supine with hips adduction and knee extension.
Therapist Position	Standing bedside the patient at the level of the knee.
Stabilisation	Stabilise at the ankle and knee to support the weight of the leg.
Patient Instruction	“Move your leg out to the side keeping your knee and toes pointing towards the ceiling.”
Test Motion	Start at 0° the patient abducts the hip through the full available range of motion without rotation.

Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

Knee Flexion



Figure.10 Knee Flexion Gravity Resisted Test Position

Anatomical Information ²		
Nerve Innervation	L5, S1, S2	
Primary Muscles	Hamstrings (Semitendinosous, Semimembraneosous, Biceps Femoris)	
Other Muscles Involved	Gracilis, Tensor Fascia Latae, Sartorius, Popliteus, Gastrocnemius, Plantaris	
Gravity Resisted Position ^{1, 2, 3}		
Patient Position	Prone with hip in neutral and knee extension with feet off the end of the plinth.	
Therapist Position	Stand on the same side as the leg to be tested.	
Stabilisation	Stabilise the patient's pelvis or proximal hamstrings.	
Patient Instruction	“Bend your knee towards your buttocks.” If a patient demonstrates full range of motion, place them in 90 knee flexion and ask them to ; “Hold and don’t let me move your your leg”	
Test Motion	Patient flexes the knee to 90. Apply resistance on the posterior leg just above the Ankle in a longitudinal direction.	
Gravity Minimised Position ^{1, 2, 3}		
Patient Position	Side lying with test leg uppermost supported by therapist with hip flexed to 45 and knee extended. The lower leg is flexed at the hip and knee for stability.	
Therapist Position	Standing behind the patient at the level of the thigh.	
Stabilisation	Stabilise uppermost leg at the ankle and thigh just below the knee to support the weight of the leg.	
Patient Instruction	“Bend your knee towards your buttock as far as you can go.”	
Test Motion	Start at 0° the patient flexes the knee through the full available range of motion.	
Clinical Tip	Therapist should only provide support for the weight of the leg, ensuring the patient complete the motion independently.	
Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

Knee Extension



Figure.11 Knee Extension Gravity Resisted Test Position

Anatomical Information ²	
Nerve Innervation	L2, L3, L4
Primary Muscles	Quadriceps (Rectus Femoris, Vastus Lateralis, Intermedius, Medialis Longus and Medialis Oblique)
Other Muscles Involved	Tensor Fascia Latae

Gravity Resisted Position ^{1, 2, 3}	
Patient Position	Sitting on the plinth with legs hanging. Patient can support themselves with their hands on the table..
Therapist Position	Stand on the same side as the leg to be tested.
Stabilisation	Stabilise the patient's thigh just above the knee.
Patient Instruction	“Straighten your leg.” If a patient demonstrates full range of motion, place them in 45° knee flexion and ask them to ; “Hold and don’t let me move your your leg”
Test Motion	Patient flexes the knee to 90. Apply resistance on the anterior leg just above the ankle in a downward direction.

Gravity Minimised Position ^{1, 2, 3}	
Patient Position	Side lying with test leg uppermost supported by therapist with hip flexed to 45 and knee extended. The lower leg is flexed at the hip and knee for stability.
Therapist Position	Standing behind the patient at the level of the thigh.
Stabilisation	Stabilise uppermost leg at ankle and thigh just below the knee to support the weight of the leg.
Patient Instruction	“Straighten your knee as far as you can go.”
Test Motion	Start at 0° the patient flexes the knee through the full available range of motion.
Clinical Tip	Therapist should only provide support for the weight of the leg, ensuring the patient complete the motion independently.

Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

Ankle Plantarflexion



Figure.12 Ankle Plantarflexion Gravity Resisted Start Position



Figure.13 Ankle Plantarflexion Gravity Resisted End Position

Anatomical Information ²

Nerve Innervation	S1, S2
Key Muscles Involved	Gastrocnemius and Soleus
Other Muscles Involved	Tibialis Posterior, Plantaris, Peroneus Longus and Brevis, Flexor Digitorum & Hallucis Longus

Gravity Resisted Position ^{1, 2, 3}

Patient Position	Stand on the test leg with knee extension and foot flat on the ground. Patient may rest one or both hands on the plinth or on the therapists hands for balance.
Therapist Position	Stand in front of the patient.
Patient Instruction	“Rise up on your toes keeping your knee straight.” If a patient demonstrates full range of motion ask them to ; “Repeat the motion as many times as you can”
Test Motion	Patient plantar flexes the foot through the full range of motion while keeping the knee straight.
Clinical Tip	Monitor the support through the upper limbs to ensure patient is not pushing through the arms.

Gravity Minimised Position ^{1, 2, 3}

Patient Position	Side lying with test leg uppermost supported by therapist with hip and knee extended and the ankle in neutral. The lower leg is flexed at the hip and knee for stability.
Therapist Position	Standing behind the patient at the level of the leg.
Stabilisation	Stabilise uppermost leg at the knee and medial aspect of the foot to support the weight of the leg.
Patient Instruction	“Point your toes away from you far as you can go.”
Test Motion	Start at 0° the patient plantar flexes the ankle through the full available range of motion.
Clinical Tip	Therapist should only provide support for the weight of the leg, ensuring the patient complete the motion independently.

Practice Results

	Measurement 1:	Measurement 2:
Right		
Left		

Ankle Inversion



Figure.14 Ankle Inversion Gravity Resisted Test Position

Anatomical Information ²		
Nerve Innervation	L4, L5	
Primary Muscles	Tibialis Posterior	
Other Muscles Involved	Tibialis Anterior, Soleus, Flexor Digitorum & Hallucis Longus, and Extensor Hallucis Longus	
Gravity Resisted Position ^{1, 2, 3}		
Patient Position	Short sit or side lying with the test leg lowermost with foot extended beyond the edge of the bed and the ankle in slight plantarflexion.	
Therapist Position	Stand or sit behind the leg to be tested at level of foot.	
Patient Instruction	“Turn your foot up towards the ceiling.” If a patient demonstrates full range of motion ask them to ; “Hold and don’t let me move your foot.”	
Test Motion	Patient inverts the subtalar joint through the full range of motion. Apply resistance over the medial aspect of the foot in a downward direction.	
Gravity Minimised Position ^{1, 2, 3}		
Patient Position	Supine with hip and knee extended and ankle in slight plantarflexion.	
Therapist Position	Stand facing the patient at the foot of the plinth level with their feet.	
Stabilisation	Stabilise the leg and support the foot under the calcaneus.	
Patient Instruction	“Point your toes inwards toward your other leg as far as you can go.”	
Test Motion	Start at 0° the patient inverts the subtalar joint through the full available range of motion.	
Practice Results		
	Measurement 1:	Measurement 2:
Right		
Left		

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