

# GUIDELINES FOR ORTHOPAEDIC EXAMINATIONS

This assessment must be completed, signed and dated by a registered health professional. For applicants under the age of 18 this form must also be countersigned by a parent or guardian

## The applicant should ensure that:

- This physiotherapy assessment is completed by a registered physiotherapist (preferably with dance or muscle-balance experience)
- Appropriate clothing is worn. The spine and limb measurements need to be viewed and therefore need to be visible. Accordingly the applicant should be prepared to undergo the assessment in underwear or similar clothing (e.g. bike shorts and sports bra)
- The applicant completes the questionnaire section of the assessment prior to presenting for the physiotherapy assessment
- A copy of this assessment should be kept by the applicant for their own records

## The health professional should ensure that:

- The applicant is not warmed up prior to the assessment
- All methods of measurement are closely adhered to
- A goniometer and non-elastic measuring tape are used where necessary
- The completed questionnaire is reviewed and commented upon where necessary

## TESTING PROTOCOLS FOR DANCERS

The reliability of examination results can be influenced by:

- Variability between testers
- Individual variability in the applicant being tested
- Inherent errors in the testing procedures

In order to minimise the level of variability between results, the testing procedures undertaken should be standardised. For this examination, the following protocols should be followed:

### GENERAL POSTURE

A visual observation is undertaken from the front, side and behind the standing dancer.

Special observations are made of:

#### 1. Leg Length Difference

With the dancer in crook lying, he or she is asked to raise their hips off the ground and drop them back to start position. The therapist then straightens the dancer's legs by grasping their ankles and compares the relative height of the medial malleoli. If a difference is noted then measurement from the ASIS to medial malleoli should be undertaken.

#### 2. Metatarsal Formula

Relative lengths of the metatarsals should be noted and measured from the longest to shortest. For example, in a foot in which the second metatarsal is longer than the first, third, fourth and fifth respectively, the measurement is noted as 21345.

#### 3. Hallux Valgus

A measurement of greater than  $10^\circ$  between the line of the 1<sup>st</sup> metatarsal and the 1<sup>st</sup> phalanx is taken as a positive reading.

## LOWER LIMB

### 1. Hip rotation (Hip neutral)

The dancer lies in supine with knees bent over the end of the plinth. The resting leg is lifted to place the foot flat on the end of the plinth (knee bent to ceiling). The following measurements are undertaken:

- a. The dancer is asked to actively rotate the test hip. The pelvis and thigh must remain flat on the plinth. The angle between the tibia and vertical is measured.
- b. This test is repeated with the examiner over pressing external rotation and measuring the angle between the tibia and vertical. The pelvis and thigh must remain flat on the plinth.
- c. The examiner overpressures internal rotation and measures the angle between the tibia and vertical. The pelvis and thigh must remain flat on the plinth.

## **2. Iliopsoas Flexibility (Modified Thomas Test)**

The dancer perches on the end of the testing plinth and rolls back to lying whilst holding both knees and chest. The dancer is asked to keep hold of the contra lateral limb in maximal flexion of the hip (to maintain neutral lumbar spine) as the tested thigh is lowered towards horizontal (knee is relaxed into flexion). The dancer should relax the hip and thigh muscles. The angle of hip flexion is measured with a goniometer between the horizontal and the long axis of the femur (between greater trochanter and the lateral tibial condyle). The hip angle is recorded as positive or negative from the 0° axis (horizontal). For example, -7° denotes a hip flexed above horizontal, 12° represents a thigh that lies below the horizontal.

## **3. Straight Leg Raise**

With the dancer lying in supine, the leg is raised and over pressured without any pelvic tilting i.e. neutral lumbar. Slight hip adduction should be maintained and hip external rotation prevented. A visual estimate will suffice.

- a. The foot is held in relaxed position in order to measure the length of the hamstrings
- b. The measure is retested with the ankle dorsiflexed in order to measure the length of the neural structures

## **4. Patella Mobility**

With the dancer in long sitting and quadriceps relaxed, palpation of each patella is undertaken and the relative mobility laterally is noted.

## **5. Knee Hyperextension**

With the dancer in long sitting on a plinth, he or she is asked to actively dorsiflex the ankle and straighten the knee fully. The distance between the heel and the top of the plinth is then measured in centimetres.

## **6. 1<sup>st</sup> Metatarsal Joint Extension**

With the dancer in long sitting, the 1<sup>st</sup> MTP joint is over pressured into extension and the angle measured.

## **7. Pointe**

With the dancer in long sitting and the foot over the end of the bed, the foot is actively pointed. Using the medial malleolus as the fulcrum, the angle between the line of the tibia and the lateral joint line of the first MTP joint is measured and noted.

## **8. Soleus Flexibility (Plié)**

With the dancer standing in front of a wall, he or she performs a demi plié in parallel to touch the bending knee to the wall (heel stays in contact with the ground, knee bends over the second toe). The distance from the wall to the big toe is measured and noted. If the dancer is inflexible in this measurement (and the knee and big toe cannot contact the wall simultaneously), a reading may need to be taken from the knee to the wall. This latter reading would be a negative measurement.

## **9. Lumbar Spine Extension**

With the dancer in standing, lumbar spine extension is observed with particular attention paid to:

- a. Range of movement available
- b. Control of the movement afforded by the lower abdominals (transversus abdominis) – especially as the dancer returns to the upright position.

NB: range of movement can also be tested in lying.

### **10. Prone Hip Extension (Glut vs. Hamstring Firing Pattern)**

Lying on stomach, arms against sides, forehead resting on the bed, the dancer is asked to actively extend one leg straight off the bed (arabesque), approximately 10cms. Muscle firing patterns are observed and control of pelvis position. Watch to see if pelvis rotates or lumbar spine hyper extends – with correct muscle activation this should not occur. Looking for activation of the front of the abdominal wall, and gluteal activation to control the pelvic position, before the hamstring fires to extend the hip.

### **11. Posterior Gluteus Medius Strength**

The dancer lies on their side. Allow underneath leg to come forward of the pelvis slightly to stabilise the dancer in that position. Top leg should be straight and held up by the dancer. With one hand on the PSIS, the Physiotherapist should push the pelvis slightly forward. With the other hand move the dancer's top leg into extension and external rotation (arabesque derriere in turnout) without the pelvis moving anteriorly too much. The dancer is asked to hold that position whilst the Physiotherapist tries to push their leg to the bed, aiming for the dancer to hold the position against gravity and your resistance.

### **ABDOMINAL STABILITY TEST**

The main purpose of this test is to assess the stabilising function of transversus abdominis (TA). The dancer is instructed to draw in the lower abdominals and to maintain the neutral spine position. The tester palpates the lower abdomen (TA) for continued contraction throughout the test. One hand can be placed under the dancer's lower back to encourage and facilitate the dancer to maintain the neutral spine position. Failure to complete the test occurs when the back arches or tension is lost from the TA (palpation). Relaxed breathing throughout the test should be encouraged.

The first 5 tests are performed in crook lying (dancer lying on their back with knees bent and feet on the floor, hip distance apart with arms by the side)

- Grade 1:** the dancer is able to maintain the lower abdominal activation / neutral spine position whilst breathing.
- Grade 2:** the dancer maintains the lower abdominal activation / neutral spine position and easy breathing whilst lowering both upper limbs overhead from vertical.
- Grade 3:** the dancer maintains the lower abdominal activation / neutral spine position and easy breathing whilst sliding one foot along the floor to knee extension and returning to start. Arms should be by the side.
- Grade 4:** the dancer is able to maintain the lower abdominal activation / neutral spine position and easy breathing whilst lifting one leg 2cms off the supporting surface, replacing the foot and repeating with the other leg. Arms should be by the side.
- Grade 5:** the dancer is able to maintain the lower abdominal activation / neutral spine position and easy breathing whilst lifting one leg, extending this leg straight and return to start. Ensure that the leg remains 2cms above the supporting surface throughout the test. Arms should be by the side.
- Grade 6:** Whilst lying on back with one leg raised to 90° hip flexion / 90° knee flexion position, the dancer is able to maintain the lower abdominal activation / neutral spine position and easy breathing whilst lifting the second foot 2cms off the supporting surface and returning it to the start position. Arms should be by the side.
- Grade 7:** the dancer is able to maintain the lower abdominal activation / neutral spine position and easy breathing whilst extending one leg to a horizontal position just above the supporting surface, and returning it to the start. Arms should be by the side.
- Grade 8:** as for grade 7, but whilst also lowering the opposite arm from vertical to overhead as the dancer maintains the lower abdominal activation / neutral position and easy breathing. Other arm should be by the side.
- Grade 9:** as for grade 7, but lower both legs to a horizontal position just above the supporting surface, and return to the start whilst maintaining the lower abdominal activation / neutral spine position and easy breathing. Arms should be by the side.

**Grade 10:** as for grade 9, but whilst lowering both arms from vertical to overhead as the dancer maintains the lower abdominal activation / neutral spine position and easy breathing.

## **UPPER LIMB**

### **Shoulder Flexion**

In standing with the thumbs facing forwards, the dancer raises both arms forward and above the head as far as possible. The angle between the long axis of the humerus (between the superior tip of the olecranon process and the midpoint of the lateral border of the acromion process) and the vertical (using the lateral midline of the iliac crest as a guide) is measured. A visual estimate will suffice.

### **Wrist Extension**

The dancer's wrist is over pressured into extension and the angle between the line of the 5<sup>th</sup> metacarpal and the shaft of the ulna is measured. A visual estimate will suffice.

**NEW ZEALAND SCHOOL OF DANCE ORTHOPAEDIC  
EXAMINATION FORM**

This orthopaedic examination must be completed by a registered physiotherapist, preferable with dance or muscle-balance experience. Any queries regarding this form should be addressed to Susan Simpson, NZSD Physiotherapist, email: [susan@savinggrace.co.nz](mailto:susan@savinggrace.co.nz)

Name of Applicant: \_\_\_\_\_

Date of Birth: \_\_\_\_\_ Age: \_\_\_\_\_  Male  Female  Other

**A. SUBJECTIVE ASSESSMENT**

**1. Previous Injuries:**

Has the applicant ever had any injuries to the following body parts that have resulted in them being unable to dance for more than one week? *(please tick appropriate boxes)*

	Yes	No	Year		Yes	No	Year
Left foot / Toes	<input type="checkbox"/>	<input type="checkbox"/>	_____	Left knee	<input type="checkbox"/>	<input type="checkbox"/>	_____
Right foot / Toes	<input type="checkbox"/>	<input type="checkbox"/>	_____	Right knee	<input type="checkbox"/>	<input type="checkbox"/>	_____
Left ankle	<input type="checkbox"/>	<input type="checkbox"/>	_____	Right ankle	<input type="checkbox"/>	<input type="checkbox"/>	_____
Left shin	<input type="checkbox"/>	<input type="checkbox"/>	_____	Right shin	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hip / Groin	<input type="checkbox"/>	<input type="checkbox"/>	_____	Lower back	<input type="checkbox"/>	<input type="checkbox"/>	_____
Spine / Neck	<input type="checkbox"/>	<input type="checkbox"/>	_____	Shoulders / Arms	<input type="checkbox"/>	<input type="checkbox"/>	_____

If you have ticked yes to any of the above questions, please give details of diagnosis, treatment and current status of that injury. Please note that the New Zealand School of Dance requires full medical clearance by a sports physician or orthopaedic specialist (in particular for longer term cases and after any surgical procedure), and expect that the dancer can begin their dance training at the School fully fit.

Diagnosis: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Treatment: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Recommendation for further treatment / expected time frame for recovery: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Dance Availability: \_\_\_\_\_

**2. Current Injuries:**

Does the applicant have any current injuries that are interfering with full dance training? Which body parts are affected? *(please tick appropriate boxes)*

	Yes	No	Year		Yes	No	Year
Left foot / Toes	<input type="checkbox"/>	<input type="checkbox"/>	_____	Left knee	<input type="checkbox"/>	<input type="checkbox"/>	_____
Right foot / Toes	<input type="checkbox"/>	<input type="checkbox"/>	_____	Right knee	<input type="checkbox"/>	<input type="checkbox"/>	_____
Left ankle	<input type="checkbox"/>	<input type="checkbox"/>	_____	Right ankle	<input type="checkbox"/>	<input type="checkbox"/>	_____
Left shin	<input type="checkbox"/>	<input type="checkbox"/>	_____	Right shin	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hip / Groin	<input type="checkbox"/>	<input type="checkbox"/>	_____	Lower back	<input type="checkbox"/>	<input type="checkbox"/>	_____
Spine / Neck	<input type="checkbox"/>	<input type="checkbox"/>	_____	Shoulders / Arms	<input type="checkbox"/>	<input type="checkbox"/>	_____

Please give a full description of the injury, treatment sought, current stage in rehabilitation programme and dance capacity. Please note that the New Zealand School of Dance requires full medical clearance by a sports physician or orthopaedic specialist (in particular for longer term cases and after any surgical procedure), and expects that the dancer can begin their dance training at the School fully fit.

Diagnosis: \_\_\_\_\_

Treatment: \_\_\_\_\_

Recommendation for further treatment / expected time frame for recovery: \_\_\_\_\_

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Dance Availability: \_\_\_\_\_

Have you had any specific history of bone stress, and if so please indicate:

- Location / Where : \_\_\_\_\_

- Symptoms: \_\_\_\_\_

- Treatment / Investigation (X-ray/MRI/CT/moonboot etc): \_\_\_\_\_

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## B. OBJECTIVE ASSESSMENT

### GENERAL POSTURE *(Please tick appropriate boxes)*

#### Postural Symmetry

Iliac crest height	<input type="checkbox"/> Normal	<input type="checkbox"/> Right High	<input type="checkbox"/> Left High
PSIS height	<input type="checkbox"/> Normal	<input type="checkbox"/> Right High	<input type="checkbox"/> Left High
Scapula position	<input type="checkbox"/> Normal	<input type="checkbox"/> Right High	<input type="checkbox"/> Left High

#### Head and Neck Posture

<input type="checkbox"/> Normal	<input type="checkbox"/> Poked	<input type="checkbox"/> Retracted
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#### Scoliosis

<input type="checkbox"/> Normal	<input type="checkbox"/> Structural	<input type="checkbox"/> Postural
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#### Thoracic Kyphosis

<input type="checkbox"/> Normal	<input type="checkbox"/> Hyper	<input type="checkbox"/> Hypo
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#### Lumbar Lordosis

<input type="checkbox"/> Normal	<input type="checkbox"/> Hyper	<input type="checkbox"/> Hypo
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#### Pelvic Tilt

<input type="checkbox"/> Normal	<input type="checkbox"/> Anterior	<input type="checkbox"/> Posterior
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#### Leg Length Difference

<input type="checkbox"/> Normal	<input type="checkbox"/> Right approximately	..... mm longer
	<input type="checkbox"/> Left approximately	..... mm longer

#### Foot Posture

Right	<input type="checkbox"/> Normal	<input type="checkbox"/> Pronation	<input type="checkbox"/> Supination
Left	<input type="checkbox"/> Normal	<input type="checkbox"/> Pronation	<input type="checkbox"/> Supination

#### Metatarsal Formula

Right	<input type="checkbox"/> 1 2 3 4 5	<input type="checkbox"/> 2 1 3 4 5	<input type="checkbox"/> .....
Left	<input type="checkbox"/> 1 2 3 4 5	<input type="checkbox"/> 2 1 3 4 5	<input type="checkbox"/> .....

#### Hallux Valgus (Bunion)

<input type="checkbox"/> Normal	<input type="checkbox"/> Right	<input type="checkbox"/> Left
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## LOWER LIMB

### ANKLES and FEET

<i>Measurement</i>	<i>Right</i>	<i>Left</i>	<i>Preferred Requirement</i>	<i>Minimal</i>
1st MTP Joint (Big Toe) Extension	.....	.....	90°	
Pointe	.....	.....	160°	
Soleus Flexibility (Plié)	.....	.....	8 cms	
Gastrocnemius Flexibility (Calf)	.....	.....	15°	

### KNEE *(Please tick appropriate boxes)*

#### Patella Mobility

Right	<input type="checkbox"/> Normal	<input type="checkbox"/> Hyper mobile	<input type="checkbox"/> Hypo mobile
Left	<input type="checkbox"/> Normal	<input type="checkbox"/> Hyper mobile	<input type="checkbox"/> Hypo mobile

#### VMO Development

Right	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Left	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor



**Vastus Lateralis Development**

Right  Good  Overdeveloped  Poor  
 Left  Good  Overdeveloped  Poor

**HIP**

<i>Measurement</i>	<i>Right</i>	<i>Left</i>	<i>Preferred Requirement</i>	<i>Minimal</i>
Hip External Rotation (Hip Neutral)				
Active	.....	.....	30°	
Passive	.....	.....	45°	
Hip Internal Rotation (Hip Neutral)				
Passive	.....	.....	20°	
Rectusfemoris Flexibility	.....	.....	Parallel Thigh with 80° knee flexion	
Iliotibial Band Flexibility	.....	.....	Parallel Thigh Neutral thigh alignment	
Iliopsoas Flexibility	.....	.....	Parallel Thigh 0° - 15° from neutral hip motion	
Straight Leg Raise				
Foot Relaxed (Hamstring)	.....	.....	F = 130°	M = 90°
Foot Dorsiflexed (Neural)	.....	.....	F = 120°	M = 90°

**TRUNK / SPINE** *(Please tick appropriate boxes)***Lumbar spine (Low Back) Extension**

Range of movement  Normal  Hyper mobile  Hypo mobile  
 Control of movement  Good  Fair  Poor

**Gluteal vs. Hamstring Firing Pattern**

**(prone hip extension)**  Good  Fair  Poor

**Posterior Gluteus Medius Strength**

Good  Fair  Poor

**Hop Test/Single Knee Bend**

- |   |  |
|---|--|
| <input type="checkbox"/> Normal   | <input type="checkbox"/> Inferior movement of ASIS/PSIS on non-weight bearing side |
| <input type="checkbox"/> Posterior drop of pelvis on weight bearing leg | <input type="checkbox"/> Uncontrolled hip adduction, flexion or Internal rotation  |
| <input type="checkbox"/> Knee (valgus) deviation                        | <input type="checkbox"/> Excessive pronation of the foot                           |

**Abdominal Stability Test**

10    9    8    7    6    5    4    3    2    1

**UPPER LIMB**

<i>Measurement</i>	<i>Right</i>	<i>Left</i>	<i>Preferred Requirement</i>	<i>Minimal</i>
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Shoulder Flexion (Elevation)	.....	.....	180°	
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Wrist Extension	.....	.....	90°	
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*(Please tick appropriate boxes)*

Scapulothoracic Rhythm	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor	
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**GENERAL COMMENT:**

Please provide an overview on the dancer's workload (hours of dance per week), injury problems (including time required off dance in the last year), styles of dance and supplementary training programmes the applicant participates in:

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In your opinion, do you feel this candidate is suitable for full time training in dance? \_\_\_\_\_

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Signed: \_\_\_\_\_ Date: \_\_\_\_\_

Name of Orthopaedic Assessor: \_\_\_\_\_

Qualification: \_\_\_\_\_

Date of assessment: \_\_\_\_\_ Phone: (Bus) \_\_\_\_\_

Address: \_\_\_\_\_

Email: \_\_\_\_\_

**DISCLAIMER:**

I understand that the results of this screening can be discussed by the above-signed physiotherapist with the staff undertaking the auditions for the New Zealand School of Dance.

Applicant's signature: \_\_\_\_\_ Date: \_\_\_\_\_

Parent / Guardian's signature: \_\_\_\_\_ Date: \_\_\_\_\_  
(required for applicants under the age of 18 years)