



Professional issue

## Mulligan Concept manual therapy: Standardizing annotation



Jillian Marie McDowell<sup>a,\*</sup>, Gillian Margaret Johnson<sup>b</sup>, Barbara Helen Hetherington<sup>c</sup>

<sup>a</sup> Prohealth Physiotherapy, 124 Kelvin St, Invercargill 9810, New Zealand

<sup>b</sup> Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy, University of Otago, Dunedin, New Zealand

<sup>c</sup> Unit 3204, The Poynton, 142 Shakespeare Rd, Takapuna, Auckland 0622, New Zealand

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### ABSTRACT

Quality technique documentation is integral to the practice of manual therapy, ensuring uniform application and reproducibility of treatment. Manual therapy techniques are described by annotations utilizing a range of acronyms, abbreviations and universal terminology based on biomechanical and anatomical concepts. The various combinations of therapist and patient generated forces utilized in a variety of weight-bearing positions, which are synonymous with Mulligan Concept, challenge practitioners existing annotational skills. An annotation framework with recording rules adapted to the Mulligan Concept is proposed in which the abbreviations incorporate established manual therapy tenets and are detailed in the following sequence of; starting position, side, joint/s, method of application, glide/s, Mulligan technique, movement (or function), whether an assistant is used, overpressure (and by whom) and numbers of repetitions or time and sets. Therapist or patient application of overpressure and utilization of treatment belts or manual techniques must be recorded to capture the complete description. The adoption of the Mulligan Concept annotation framework in this way for documentation purposes will provide uniformity and clarity of information transfer for the future purposes of teaching, clinical practice and audit for its practitioners.

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## 1. Introduction

The Mulligan Concept of manual therapy is based on the application of a sustained accessory joint mobilization, often in a weight-bearing position, which utilizes patient generated active or functional tasks through a specified range of joint movement (Vicenzino et al., 2011). As the use of mobilization with movement (MWM) techniques has increased, the number of studies analyzing the efficacy of Mulligan's techniques has proliferated in the field of peripheral manual therapy (Paungmali et al., 2003; Collins et al., 2004; DeSantis and Hasson, 2006; Vicenzino et al., 2006; Penso, 2008; Teys et al., 2008; Amro et al., 2010; Teys et al., 2013). There is also a corresponding increase of investigations examining the use of MWM in spinal rehabilitation (Hall et al., 2007; Konstantinou et al., 2007; Moutzouri et al., 2008; Richardson, 2009).

Accurate annotation of Mulligan Concept manual therapy is essential to ensure future quality dissemination of clinical information within patient records, research, education, governance and audit. This paper presents a documentation framework, based on existing

annotation applicable to Mulligan techniques, utilizing acronyms, abbreviations and tenets common to established manual therapy approaches. For the purpose of this paper the term 'annotation' refers to the specific formula recording a manual therapy technique.

## 2. Manual therapy annotation

Manual therapy annotations may be likened to a sequential set of operational instructions whereby details of all parameters (the task as well as the position of the patient during treatment, placement of the therapist's hand and amplitude, speed and directions of force applied by the therapist) are recorded for exact technique reproduction. These annotations are based on terminology derived from biomechanical and anatomical concepts, which are universally understood by physiotherapists for describing the location and types of forces applied to the human body.

Annotational methods currently utilized by physiotherapists in manual therapy practice are influenced by the nature of their training backgrounds. Since Mennell wrote his first book on mobilization in 1911 (Mennell, 1911), therapists such as Kaltenborn (Kaltenborn, 1970), Grieve (Grieve, 1975), Maitland (Maitland, 1978), McKenzie (McKenzie, 1981) and Edwards (Edwards, 1992) have utilized systems of acronyms, grades (oscillatory and sustained), symbols and assessment sheets pertinent to their

\* Corresponding author. Tel.: +64 3 2189052; fax: +64 3 2141950.

E-mail addresses: [jillianmcdowell@gmail.com](mailto:jillianmcdowell@gmail.com), [jillian.mcdowell@xtra.co.nz](mailto:jillian.mcdowell@xtra.co.nz) (J.M. McDowell).

particular approach. Several unique technique acronyms developed by Mulligan (Mulligan, 1989) are already commonplace within the manual therapy literature and physiotherapy patient medical records: these include the terms of sustained natural apophyseal glides (SNAGS), natural apophyseal glides (NAGS), mobilizations with movement (MWM) and pain release phenomenon (PRP). While these acronyms have achieved wide spread acceptance as written and verbal descriptive ‘short hand’ the quality of MWM annotation has been found to be highly variable and the technique tenets are inconsistently implemented and explained within the research literature (Hing et al., 2008). Therefore consideration is warranted regarding the standardization of applicable common technique annotations and abbreviations for physiotherapists practising Mulligan Concept manual therapy.

### 3. The Mulligan Concept annotational framework

The Mulligan Concept of manual therapy challenges annotational skills due to the fact that multiple parameters must be recorded for exact reproduction of each technique. MWMs utilize the dual role of both therapist force (accessory glides) and patient effort (active physiological or functional movement) and techniques are often carried out in a variety of weight-bearing positions, with treatment belts and, either additional therapist, assistant or patient applied overpressure. Consequently these MWM techniques require additional annotational detail in comparison to other manual therapy approaches.

It is recommended that annotations for techniques that utilize the Mulligan Concept adopt the following parameters in sequential order namely: *start position (including weight bearing or non weight bearing), side, joint/s, method of application (belt, harness, self-generated), glides applied, name of the Mulligan technique, movement (or function), whether an assistant is used, overpressure (and by whom), repetitions or time and sets.* These mobilization parameters correspond to five out of the six of manipulation characteristics already proposed by the American Academy of Manual Physical Therapists (Mintken et al., 2008) in their guidelines for describing a manipulation technique. Five McKenzie parameters (side, repetition, direction, start position and overpressure) (McKenzie, 1981) and five out of six Maitland parameters (side, joint, technique, start position, repetitions) (Maitland, 1978), are also utilized in the proposed framework. The parameter of grade (I–V) is not included in the framework as it is not applicable to Mulligan MWM techniques.

Although the authors recognize that clinicians already undertake documentation of Mulligan techniques in patient notes, a concern is raised that the level of detail provided is often overly simplistic. Take for example a peripheral ‘MWM knee flexion lateral glide x6’ and spinal ‘SNAG L4 flexion x6’ annotation: there are seven technique variations to consider when performing and recording a lateral glide to increase knee flexion and 16 technique variations if all central, ipsilateral and contralateral L4 SNAG combinations are considered.

The use of abbreviated annotations (Appendix 1) may save time and assist clarity when Mulligan Concept practitioners share patient information. Paungmali et al. (2003) describe a technique for lateral epicondylalgia as follows: “the physical therapist used one hand to stabilize the distal end of the humerus on the lateral side just proximal to the elbow joint line while using the other hand to apply a laterally directed glide of the proximal ulnar and radius. The hand applying the lateral glide was situated just distal to the elbow joint line on the medial side of the ulna. The glide was painlessly applied and sustained for approximately 6 seconds while the participant performed the pain-free gripping action. The gliding pressure was then maintained until the participant completely released the grip. Ten repetitions of the treatment technique were applied, with approximately 15 seconds rest intervals between repetitions” (p. 376). The corresponding figure showed the patient in supine. The patient’s physiotherapy records

would be documented within the proposed annotational framework accordingly as “sup ly R Elb Lat gl MWM res grip ×6sec(10)”.

#### 3.1. Mulligan specific annotation rules

Techniques with unique applications have annotation rules that may also simplify recording and there are certain premises specific to Mulligan techniques. For example, a cervical NAG can only be performed in sitting but, for consistency across techniques that have multiple start positions, the positional parameter should always be included. It would also appear pedantic to record whether a treatment belt was used for a lumbar SNAG if this was more commonplace than manual pelvic stabilization. Again however to maintain consistency it should be recorded as in other MWMs it may be more common to perform it manually. The following operational rules for the annotational framework are outlined as follows:

- NAGS and SNAGS – the therapist’s contact points are central on the spine unless notated otherwise. Documentation must stipulate whether the therapist’s contact position is on the right or left of the spinal segment as a SNAG may be ipsilateral or contralateral to the active movement.
- Transverse SNAGS (formerly called positional SNAGS), spinal mobilization with arm movement (SMWAM), and spinal mobilization with leg movement (SMWLM) – if the annotation states “L T1” this notates the therapist contact point: that is, the therapist applies pressure to the left of the T1 spinous process and applies a transverse glide towards the right.
- If overpressure is applied then it should be recorded. Special notation should occur if it is performed by a third party or has a special application: for example, the patient’s partner administers the overpressure during a self-cervical rotation SNAG. Otherwise all overpressure should be considered patient generated.
- If a technique has both a manual and a treatment belt method of application then the use of a belt should always be recorded. When “belt” is missing from the annotation the practitioner will assume it is a manual technique.
- If more than one corrective glide is applied (for example to the scapula for a scapulothoracic MWM) then the glides should be listed in the order of emphasis or magnitude of force. If more inferior glide is needed than external rotation, medial glide and compression then it should be listed as “Inf gl/ER/Med gl/Comp”. Forward slash lines separate multiple glides (in keeping with Maitland’s combined movements (Maitland, 1978)) and dashes indicate combined glides (for example in the “Post-sup gl” of the inferior tibiofibular joint, Appendix 2).
- The clinical reasoning underpinning the Mulligan Concept recommends that only three repetitions of a technique be performed if a patient’s condition is highly acute or irritable (Vicenzino et al., 2011). Accordingly, the number of repetitions should be recorded as “×3”. Once a condition is sub-acute or chronic then six to ten repetitions may be used in three to five sets. The annotation “×6(3)” would indicate six repetitions were performed three times with a rest between each set.
- As a pain release phenomenon (PRP) is a sustained technique it is best recorded by duration but the technique also may have sets applied; for example “×20sec(3)” indicating that three 20 s contractions, stretches or compressions were performed with a rest between each set.
- NAGS are applied at the rate of three per second and here each second should be considered a set. Typically, 3–4 s are performed per segment before retesting (personal communication Brian Mulligan). If “sit L C5 NAG x4sec” is recorded this should be interpreted as 12 glides to the C5 segment.
- Rib MWM with a single point of contact over the posterior chest wall should be recorded using “costovertebral” (CV) in the

annotation. This abbreviation allows differentiation from the double hand rib MWM where the rib is lifted anteriorly and posteriorly, and recorded using “rib” in the annotation.

- Self-treatments may be performed with a handgrip, fist, towel, or treatment belt with the method of application also included when recording home exercise prescriptions.

Worked examples of key Mulligan techniques are displayed in Appendix 2. If abbreviations are not accepted in the therapist’s area of practice then it is recommended that the annotations be written in long hand, although still in the same framework order of parameter description specified above. The authors have specifically chosen text abbreviations for the framework to facilitate the typing of electronic patient notes without insertion of symbols, but the established symbols developed by Maitland (Maitland, 1978) may be used interchangeably with accompanying text (Appendix 1).

#### 4. Summary

To adequately annotate the treatment dimensions of the Mulligan Concept manual therapy techniques it is recommended that

parameters are reported within a sequential framework as follows: starting position, side, joint/s, method of application, glide/s, Mulligan technique, movement or function, assistance, overpressure (and source) and details of numbers of repetitions or time and sets. Information regarding the therapist or patient application of overpressure, the help of an assistant, or utilization of a treatment belt are required to capture the complete description of these techniques. Even if the exact order of these parameters is not consistent with the annotational framework, the inclusion of all the components is still considered the minimum requirement for documentation of Mulligan Concept manual therapy techniques. Standardizing annotation will ensure that future comparisons may be made between studies, reproducibility of techniques between practitioners is guaranteed, and accurate patient records exist for audit purposes.

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#### Appendix 1

Abbreviations for use in Mulligan Concept annotations.

Start position	Side	Joints/anatomy	Glides (text)	Mulligan technique	Movement	Repetitions/time/sets
pr ly = Prone lying	L = left R = right	ACJ = acromioclavicular joint Ank = ankle	AP = anteroposterior# Ant = anterior	BLR = bent leg raise HA SNAG = headache sustained natural apophyseal glide	Ab = abductionΦ Ad = adductionΦ	sec = seconds min = minutes
sit = Sitting		Calc = calcaneum	Comp = compressionΦ	MWM = mobilisation with Movement	Dev = deviation	× = times
s ly = Side lying		CV = costovertebral joint Cx = cervical spine	Dist = distraction gl = glide	NAG = NATURAL apophyseal glide	DF = dorsiflexionΦ DFIS = dorsiflexion in standing	() = sets <b>Other</b>
st = Standing		C3 = cervical spine 3rd vertebra	Inf = inferior	Rev NAG = reverse natural apophyseal glide	ELL = extension in lying❖	+A = with assistant
sup ly = Supine lying		Eib = elbow Fib = fibula	Lat = lateralΦ Med = medialΦ	Rev HA SNAG = reverse headache sustained natural apophyseal glide	El = elevationΦ	+2A = with 2 assistants
WB = weight bearing		Fra = forearm Gastroc = gastrocnemius	PA = posteroanterior* Post = posterior	SMWAM = spinal mobilization with arm movement	ER = external rotation	Bilat = bilateral
		GH = glenohumeral Kn = knee	Prox = proximal Sup = superior	SMWLM = spinal mobilization with leg movement	Ev = eversionΦ	OP = overpressure
		Inn = innominate L5 = lumbar spine 5th vertebra	/ Separates multiple individual glides - Indicates combined glides	SNAG = sustained natural apophyseal glide	E = extensionΦ	Unilat = unilateral
		MC = metacarpal MCP = metacarpophalangeal joint	<b>Glides (symbol)Φ</b> ↑ = anteroposterior → = lateral glide right ← = lateral glide left	Tr SLR = traction straight leg raise	F = flexionΦ	
		MT = metatarsal MTP = metatarsophalangeal joint	↓ = posteroanterior ↔ = longitudinal	Trans SNAG = transverse sustained natural apophyseal glide	HF = horizontal flexionΦ	
		PFJ = patellofemoral joint PIP = proximal interphalangeal joint	↙ = left posterior glide ↘ = right posterior glide	Φ = lateral rotation ○ = medial rotation ↖ = lateral flexion left ↗ = lateral flexion right	HE = horizontal extensionΦ	
		PS = pubic symphysis RUJ = radio-ulnar joint			IR = internal rotation	
		SCJ = sternoclavicular joint Sh = shoulder			Inv = inversionΦ	
		SJ = sacroiliac joint Sx = sacrum			LF = lateral flexion	
		Tx = thoracic spine T4 = thoracic spine 4 <sup>th</sup> vertebra			Opp = opposition	
		Tib = tibia Wr = wrist			PF = plantarflexionΦ	
					Pron = pronation	
					PKB = prone knee bend	
					Rot = rotation	
					SKB = small knee bend	
					Supin = supination	

#Acceptable interchangeable terms for anteroposterior include dorsal and posterior (Kaltenborn, 1970; Maitland, 1978).

\*Acceptable interchangeable terms for postero-anterior include anterior and ventral (Kaltenborn, 1970; Maitland, 1978).

Φ Denotes established Maitland abbreviations and symbols (Maitland, 1978); whilst supination is recorded as ‘Sup’ in Maitland’s abbreviations it has been altered here to avoid confusion with superior glide ‘sup gl’ which is more commonly used than cephalad (ceph) and caudad (caud) in Mulligan Concept terminology.

❖ Denotes established McKenzie acronym (McKenzie, 1981).

## Appendix 2

Worked annotations for selected Mulligan Concept manual therapy techniques (abridged<sup>a</sup>).

Starting position	Side	Joint/s	Method of application	Glides	Mulligan technique	Movement/function	Assisted Overpressure (source)	Repetition/time	Sets
sit		C2-7			NAG			×3sec	
sit	R	C6-T4			Rev NAG			×3sec	
sit		C5			SNAG	Rot L	+OP	×6	(3)
sit	L	T8			SNAG	LF R		×6	(3)
sit	L	6th rib			MWM	Inspiration		×3	
sit	R	L4			SNAG	E		×6	(3)
sit		C5	Self towel		SNAG	Rot R	+OP (partner)	×6	
sit			Self		Fist Tr			×10sec	(3)
sit	R	C3/L C4			SMWAM	R Sh Ab		×6	(3)
sit	R	C5/L C6			Trans SNAG	Rot R		×6	
sit		C2			HA SNAG			×10sec	(3)
sit	L	Olecranon		Med tilt	MWM	Res grip		×6	
sit	L	Wr		Med gl	MWM	F	+OP	×6	
sit	L	Index PIP		Lat gl/IR	MWM	F	+OP	×6	
sit	R	Inf RUJ		Ant-lat gl	MWM	Supin	+OP	×6	
sit	R	ACJ		Inf gl/Post gl	MWM	F		×6	
sit	R	Scapulo thoracic		Med gl/Inf gl/Comp/ER	MWM	El	+OP	×6	
sit	L	Thumb			Stretch PRP	Finklestein		×20sec	(3)
st		Lx	Self chair		Tr			×10sec	(3)
st	L	Hip	Belt	Lat gl	MWM	IR		×6	
st	R	Sh	Belt	Inf gl/E/Ad	MWM	HBB	+OP	×6	(3)
R step st	R	Tib/Fib	Belt	Ant gl	MWM	DF		×6	
st L foot on chair	L	Inf Fib		Post-sup gl	MWM	DF		×6	
sup ly	R				BLR			×3	
sup ly	L				Gate			×20sec	(3)
sup ly	R				Tr SLR			×3	
sup ly	L	Hip	Belt	Lat gl	MWM	F	+OP	×6	
sup ly	L	Kn		Med	Squeeze	F/E		×6	
sup ly	R	Ank		Ant gl-roll	MWM	PF		×6	
sup ly	L	Inf Fib		Post-sup gl	MWM	Inv	+OP (belt)	×6	
sup ly	R	Elb	Belt	Lat gl	MWM	Res grip		×6	
pr ly	L	L2/R L3			SMWLM	PKB	+2A	×3	
pr ly		L4			SNAG	EIL		×6	
4 Point kneel		L3	Self belt		SNAG Lion			×6	
R s ly	L	L4			SMWLM	SLR	+A	×3	
	L	Kn		IR	Tape				

Note: repetitions and sets listed in this table illustrate examples of annotations and are not linked to any recommended treatment prescriptions.

<sup>a</sup> Full version available in the Online supplementary material.

## Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.math.2013.12.006>.

## References

- Amro A, Diener I, Bdaire W, Hamed A, Shalabi A, Ilyan D. The effects of Mulligan mobilisation with movement and taping techniques on pain, grip strength, and function in patients with lateral epicondylitis. *Hong Kong Physiother J* 2010;28:19–23.
- Collins N, Teys P, Vicenzino B. The initial effects of a Mulligan's mobilization with movement technique on dorsiflexion and pain in subacute ankle sprains. *Man Ther* 2004;9:77–82.
- DeSantis L, Hasson SM. Use of mobilization with movement in the treatment of a patient with subacromial impingement: a case report. *J Man Manip Ther* 2006;14:77–87.
- Edwards B. *Manual of combined movements: their use in the examination and treatment of mechanical vertebral column disorders*. Edinburgh: Churchill Livingstone; 1992.
- Grieve GP. *Mobilisation of the spine: notes on examination assessment and clinical method*. Edinburgh: Churchill Livingstone; 1975.
- Hall T, Chan HT, Christensen L, Odenthal B, Wells C, Robinson K. Efficacy of a C1–C2 self-sustained natural apophyseal glide (SNAG) in the management of cervicogenic headache. *J Orthop Sports Phys Ther* 2007;37:100–7.
- Hing W, Bigelow R, Bremner T. Mulligan's mobilisation with movement: a review of the tenets and prescription of MWMs. *N Z J Physiother* 2008;36:144–64.
- Kaltenborn F. *Mobilisation of the spinal column*. Wellington: New Zealand University Press; 1970.
- Konstantinou K, Foster N, Rushton A, Baxter D, Wright C, Breen A. Flexion mobilizations with movement techniques: the immediate effects on range of movement and pain in subjects with low back pain. *J Manip Physiol Therap* 2007;30:178–85.
- Maitland G. *Musculo-skeletal examination and recording guide*. Adelaide: Landerdale Press; 1978.
- McKenzie R. *The lumbar spine: mechanical diagnosis and therapy*. Wellington: Spinal Publications; 1981.
- Mennell J. *The treatment of fractures by mobilisation and massage*. London: Macmillan; 1911.
- Mintken P, DeRosa C, Little T, Smith B. A model for standardizing manipulation terminology in physical therapy practice. *J Man Manip Ther* 2008;16:50–6.
- Moutzouri M, Billis E, Strimpakos N, Kottika P, Oldham JA. The effects of the Mulligan sustained natural apophyseal glide (SNAG) mobilisation in the lumbar flexion range of asymptomatic subjects as measured by the Zebris CMS20 3-D motion analysis system. *BMC Musculoskel Disord* 2008;9:131–40.
- Mulligan B. *Manual therapy – "NAGS", "SNAGS", "PRP'S" etc*. Wellington: Plane View Services Ltd; 1989.
- Paungmali A, O'Leary S, Souvlis T, Vicenzino B. Hypoalgesic and sympathoexcitatory effects of mobilization with movement for lateral epicondylalgia. *Phys Ther* 2003;83:374–83.
- Paungmali A, O'Leary S, Souvlis T, Vicenzino B. Naloxone fails to antagonize initial hypoalgesic effect of a manual therapy treatment for lateral epicondylalgia. *J Manip Physiol Therap* 2004;27:180–5.
- Penso M. The effectiveness of mobilisation with movement for chronic medial ankle pain: a case study. *S Afr J Physiother* 2008;64:13–6.
- Richardson C. Treatment of cervicogenic headaches using Mulligan 'SNAGS' and postural reeducation: a case report. *Orthopaed Phys Ther Pract* 2009;21:33–8.

- Teys P, Bisset L, Collins N, Coombes B, Vicenzino B. One-week time course of the effects of Mulligan's mobilization with movement and taping in painful shoulders. *Man Ther* 2013;372–7.
- Teys P, Bisset L, Vicenzino B. The initial effects of a Mulligan's mobilization with movement technique on range of movement and pressure pain threshold in pain-limited shoulders. *Man Ther* 2008;13:37–42.
- Vicenzino B, Branjerdporn M, Teys P, Jordan K. Initial changes in posterior talar glide and dorsiflexion of the ankle after mobilization with movement in individuals with recurrent ankle sprain. *J Orthop Sports Phys Ther* 2006;36:464–71.
- Vicenzino B, Hing W, Rivett D, Hall T. *Mobilisation with movement: the art and the science*. Chatswood: Churchill Livingstone; 2011.