DEPARTMENT OF CONSUMER & BUSINESS SERVICES

M E M O R A N D U M

March 13, 2015

To: Medical Advisory Committee (MAC)

From: James O'Brien, Manager, Appellate Review Unit
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Subject: Impairment rating methods: loss of strength

Issue: Strength measurement on the 5/5 scale is subjective and can be misleading.

a. Is there a better way to measure strength and, if so, what is the method?

b. Is any new strength measurement testing readily available?

Rating strength loss in the Oregon Disability Rating Standards

Loss of strength is determined using the modified 0 to 5 international grading system described below. Strength reported as "+" is slightly greater than the reported 0/5, 1/5, 2/5, 3/5, or 4/5 while strength reported as "-" is slightly less. The worker's strength is measured and reported by the physician and each grade is assigned a percentage value according to the standards.

Grade	Description
5/5:	The worker retains range of motion against gravity with full resistance applied.
5-/5	
4+/5	
4/5:	The worker retains range of motion against gravity with some resistance applied.
4-/5	
3+/5	
3/5:	The worker retains range of motion against gravity without resistance applied
3-/5	
2+/5	
2/5:	The worker retains range of motion with gravity eliminated.
2-/5	
1+/5	
1/5:	The worker has evidence of slight muscle contractility; no joint motion.
1-/5	
0/5:	The worker has no evidence of muscle contractility

In addition to the assignment of percentage values for each range of strength on the 5/5 scale, the standards also provide a percentage value for each peripheral and spinal nerve root innervating weakened muscles.

When a worker has strength loss due to a spinal nerve root or brachial plexus injury, the impairment is determined by using the spinal nerve root percentage value. While strength loss

that does not involve a spinal nerve root or brachial plexus is valued using the peripheral nerve innervating (supplying) the muscle(s) demonstrating the strength loss.

Once the grade of strength loss is determined by the physician, the impairment value of the involved peripheral or spinal nerve, which supplies (innervates) the weakened muscle, is multiplied by this value. If there is no actual nerve damage, the impairment value is determined by multiplying the grade of strength by the peripheral or spinal nerve innervating the muscle "as if" the nerve has been damaged. The resultant impairment value is awarded to the worker for the applicable body part and converted to whole person impairment, if necessary.

Example: thumb

4/5 strength (assigned a 20% value) of the abductor pollicis brevis muscle, innervated by the median nerve (assigned a 44% value)

Muscle	(grade)	Assigned Percentage Value (%)	Assigned Percentage Value (nerve)	
Abductor pollicis brevis	4/5 =	20%	x .44	= 8.8, rounded to 9% of the thumb, converted to 2% whole person impairment

When there are multiple losses of strength in different muscles, if the muscles are supplied (innervated) by the same nerve, the loss of strength is determined by averaging the percentages of impairment for each involved muscle to arrive at a single percentage of impairment for the involved nerve.

Example: Forearm

Strength loss reported as 4/5 (20%) of the supinator muscles, 3/5 (50%) of the extensor carpi radialis, and 4/5 (20%) of the extensor carpi ulnaris, all innervated by the radial nerve (50%):

Muscles	(grade)	Assigned percentage value (%)	Assigned percentage value (nerve)	
Supinator	4/5 =	20%	x .50	= 10%
Extensor carpi radialis	3/5 =	50%	x .50	= 25%
Extensor carpi ulnaris	4/5 =	20%	x .50	= 10%
	Add			45%

Average 45% divided by 3 = 15% impairment to radial nerve awarded for the forearm, converted to 7% whole person impairment

When there are multiple losses of strength involving different muscles, but the muscles are supplied (innervated) by different nerves, the loss of strength is determined by finding the percentage of loss for each nerve and then "combining" the nerves (using a mathematical formula) for an overall loss of strength for an applicable body part.

Example: hand

Grip strength loss of the hand described as 4/5 (20%), involving muscle innervation of the median (69%), ulnar (44%), and radial (50%) nerves:

	(grade)	Assigned Percentage Value (%)	Assigned Percentage Value (nerve)	
Median (above mid-forearm)	4/5 =	20%	x .69	= 13.8, rounded to 14%
Radial (musculospiral)	4/5 =	20%	x .50	= 10%
Ulnar (above mid-forearm)	4/5 =	20%	x .44	= 8.8, rounded to 9%
			Combine	14/10/9 = 30% of the hand, converted to 14% whole person impairment