

Pilot Study: Grip Strength - Pre and Post Activator Chiropractic Adjustment.

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ABSTRACT

Background: Activator Methods Chiropractic Technique (AMCT) is often utilized for extremity adjusting. However, there have been very little, to no research conducted to establish efficacy of the AMCT wrist protocol.

Objective: The objective of this pilot study was seek to determine if the AMCT wrist assessment protocol, and treatment of the wrist with the Activator III (a short lever mechanical force, manually assisted chiropractic adjusting device,) has a positive result as demonstrated by increased grip strength pre and post adjustment as measured using a dynamometer.

Clinical features: Twenty asymptomatic research subjects were divided into two groups, placebo and actual treatment group. The group that received treatment was evaluated using AMCT protocol including the wrist scan, and treated where indicated. Actual chiropractic adjustment treatments were delivered by four chiropractic college senior interns that are advanced certified in AMCT and under the direct supervision of a licensed chiropractic physician. The placebo group was given a "sham" evaluation and treatment. Grip strength was evaluated in both groups pre and post treatment or placebo by a research partner impartial to AMCT and blinded from group membership using a dynamometer.

Conclusions: The subjects in the treatment group gained on average 0.15Kg wrist grip strength bilaterally. Placebo subjects on average lost 0.40 Kg of grip strength. Both numbers are statistically insignificant. Grip strength measurement using the dynamometer in this case was inconsistent in both subject groups. Further evaluation of the results produced a P-Value of 0.499 in the actual treatment group and P-Value .410 for the placebo. This indicates that the results were not above chance. A P-Value below .05 demonstrates that the results of a study are above chance. This study resulted in P-Value several times higher than .05 in both the treatment and placebo groups. This demonstrates a problem in the system of measurement used in this study. No conclusions can be made from this data because of the random results.

Key Words: Activator Methods Chiropractic Technique, Grip Strength, Chiropractic Manipulative Therapy

Introduction: This pilot study will seek to determine if the AMCT wrist assessment protocol, and treatment of the wrist with the Activator III (a short lever mechanical force, manually assisted chiropractic adjusting device,) has a positive result as demonstrated by increased grip strength pre and post adjustment as measured using a dynamometer. Four advanced certified Activator Methods Chiropractic Technique (AMCT) student interns according to AMCT protocol conducted the study with the assistance of one student impartial to the technique.

It is the intention of this study to add to a growing body of evidence that would justify additional research such as clinical outcome studies and larger random controlled trial projects. This study helps to lay the foundation that justifies what we do in chiropractic. First, can we find a subluxation, (i.e. anterior translation malposition of the lunate)? Second, once we find the subluxation, does our chiropractic treatment protocol make demonstrative, measurable, and reproducible positive result, (i.e. increased muscle strength)?

Activator Methods Chiropractic Technique (AMCT) is the second most widely utilized technique in the world and is employed by many chiropractors. AMCT is often utilized for extremity adjusting. However, there have been very little, to no research conducted to establish efficacy of the AMCT wrist protocol. This pilot study will seek to determine efficacy of the AMCT wrist assessment protocol, and if treatment of the wrist with the Activator III (the third generation of a short lever mechanical force manually assisted chiropractic adjusting device,) has a positive result as demonstrated by increased strength

as measured by pre and post adjustment measurement of grip strength using a dynamometer. Dynamometer's have been commonly used by health care professionals to assess grip strength and as an objective outcome measurement for pre and post carpal tunnel syndrome patients.^{1,2}

The inter-examiner reliability of the AMCT prone (quick) leg check has been researched with some positive results. In 1989, Youngquest et. al. studied inter-examiner reliability of the upper cervical AMCT isolation protocol. The Youngquest study resulted with good kappa values indicating there is high inter-examiner reliability.³ Youngquest was followed by an independent study conducted at LACC in 1999. Nguyen and his team at LACC also found that there was good inter-examiner reliability of the AMCT protocol.⁴ Mannello countered in 1992 discussing in detail the variable causes of functional short leg, the various other types of (quick Derifield type) prone leg checks, and statistical issues with the prior AMCT inter-examiner reliability studies.⁵ Mannello's conclusions require that more inter-examiner reliability studies of AMCT (quick) leg check and isolation tests be conducted.

In 2005 Holstein and Backus conducted a study into inter-examiner reliability between five examiners and 132 subjects using AMCT protocol leg check. Overall inter-examiner reliability was found to be at 80%.⁶

Fuhr and Menke most recent survey of peer reviewed, published inter-examiner reliability studies point out that there is marked improvement in inter-examiner reliability

for the Activator quick prone leg check if the examiners are using AMCT protocol and are advanced proficiency rated by AMCT.⁷ This study will utilize both the AMCT protocol and advanced proficiency rated examiners.

Since the founding of AMCT, there has been constant effort to validate the AMCT treatment protocols. Several AMCT protocols have been presented and published in peer-reviewed journals. One of the more prolific AMCT researchers has been Brad Polkinghorn. Among the AMCT treatment protocols published by Polkinghorn in peer reviewed journals are; Torn Medial Meniscus in 1994,⁸ Post-surgical Neck in 2001,⁹ Lumbar Disc herniation 1998,¹⁰ Coccygodyna in 1999,¹¹ and Frozen Shoulder Associated with Mixed Metastatic Carcinoma.¹² Prior studies of AMCT treatment protocol have been published by Frach, Osterbauer, and AW Fuhr.¹³ James W. DeVocht, DC, PhD Cynthia R. Long, PhD Deborah L. Zeitler, DDS and Walter Schaeffer, DC more recently published in 2003 a multi-subject case series using the AMCT protocol for temporomandibular joint dysfunction.¹⁴ While the above list is not exhaustive, the AMCT wrist protocol is not found among the peer reviewed published research.

Materials and Methods: This pilot study sought to determine efficacy of the AMCT wrist assessment protocol, and if treatment of the wrist with the Activator III (the third generation of a short lever mechanical force manually assisted chiropractic adjusting device,) has a positive result as demonstrated by increased strength as measured by pre and post adjustment measurement of grip strength using a dynamometer. Dynamometer's

have been commonly used by health care professionals to assess grip strength and as an objective outcome measurement for pre and post carpal tunnel syndrome patients.^{1,2}

Twenty (n=20) asymptomatic student subjects participated in this study. The subjects were divided randomly into two groups, real and placebo. The students were first asked to sign a consent form and exclusionary questionnaire. A research partner impartial to AMCT, Steven Willett, then asked the subjects to grip the dynamometer. Measurements were taken from the dynamometer from both hands and recorded. The impartial research partner was kept blinded on which group (real or placebo) the subject belonged.

The subject was then escorted into the treatment room and both assessed and adjusted using AMCT protocol, or given a sham adjustment as a placebo. Placebo subjects were asked to perform similar motions to the AMCT isolation assessment tests. The Activator III chiropractic adjustment device was then touched to the subjects at various points on the body. The Activator III was then fired without closing the preload. The design of the Activator III allows for no thrust force to exit the device without closing the preload.

While the placebo subjects feel no thrust, they do hear the click of the Activator III as it was lightly touched to their body. Actual chiropractic adjustment treatments were delivered by four Logan senior interns that are advanced certified in AMCT (Charles Joyce, Robert Hervey, Joseph Glaettli, and Angela Hummel) and under the direct supervision of a licensed chiropractic physician Toni Grossenheider. Dr. Grossenheider is the clinician for Logan College of Chiropractic flag ship outpatient clinic, The Montgomery Health Center.

After treatment the subjects, both groups, were escorted out of the treatment room and asked again to grip the dynamometer. Again, the blinded impartial research partner recorded the dynamometer readings.

Results: The subjects in the treatment group gained on average 0.15Kg wrist grip strength bilaterally. Placebo subjects on average lost 0.40 Kg of grip strength. Both numbers are statistically insignificant. Grip strength measurement using the dynamometer in this case was inconsistent in both subject groups. Further evaluation of the results produced a P-Value of 0.499 in the actual treatment group and P-Value .410 for the placebo. This indicates that the results were not above chance. A P-Value below .05 demonstrates that the results of a study are above chance. This study resulted in P-Value several times higher than .05 in both the treatment and placebo groups. This demonstrates a problem in the system of measurement used in this study. No conclusions can be made from this data because of the random results.

The following table presents the actual dynamometer readings of the twenty subjects in the study. The subjects were asked to grip the dynamometer before going into the treatment room. The subjects were then randomly divided into treatment or placebo groups. Those in the treatment group were then adjusted with the Activator. The placebo group received a “sham” adjustment. The subjects exited the study room and again asked to grip the dynamometer. The results follow:

Patient #	Pre Treatment AMCT				Post Treatment			
	Real		Placebo		Real		Placebo	
	Right	Left	Right	Left	Right	Left	Right	Left
1	64 Kg	62 Kg			67 Kg	59 Kg		
2			48 Kg	48 Kg			46 Kg	43 Kg
3	51 Kg	50 Kg			49 Kg	52 Kg		
4			46 Kg	34 Kg			40 Kg	34 Kg
5	49 Kg	50 Kg			48 Kg	40 Kg		
6			24 Kg	26 Kg			23 Kg	27 Kg
7	29 Kg	23 Kg			27 Kg	23 Kg		
8			27 Kg	26 Kg			24 Kg	26 Kg
9	24 Kg	20 Kg			24 Kg	27 Kg		
10			27 Kg	44 Kg			35 Kg	44 Kg
11	46 Kg	48 Kg			50 Kg	40 Kg		
12			50 Kg	48 Kg			40 Kg	48 Kg
13	48 Kg	46 Kg			56 Kg	54 Kg		
14			21 Kg	26 Kg			26 Kg	23 Kg
15	32 Kg	36 Kg			30 Kg	30 Kg		
16			66 Kg	66 Kg			68 Kg	68 Kg
17	52 Kg	52 Kg			58 Kg	52 Kg		
18			32 Kg	36 Kg			35 Kg	36 Kg
19	24 Kg	24 Kg			25 Kg	22 Kg		
20			22 Kg	20 Kg			21 Kg	22 Kg

Discussion: There are many ways in which another study could be improved to further analyze the effectiveness of Activator adjustments on wrist subluxations. Here is a list of ideas of improvement for a further study that will be discussed in this section: number of subjects involved, symptomatic verses asymptomatic, unbiased subjects, length of study, along with testing and monitoring strategies.

It must be stated that the sample size for the pilot study was small (n=20). Further studies must be conducted with larger sample sizes. The study subjects were asymptomatic. The subjects in this study were all chiropractic students. Also of interest, it needs to be seen if multiple Activator chiropractic adjustment treatments would produce compounded results.

The subjects have a variety of biases to include but not to be limited to: chiropractic works, Activator doesn't work, Activator is wonderful, and "I know what a real Activator adjustment is and that was a shame (for those in the control group)". It must be seen in further studies if symptomatic subjects would equally demonstrate improved grip strength.

Another study with a more accurate measuring device of showing improvement could also help shed light on the effectiveness of an Activator adjustment for wrist subluxations and carpal tunnel patients. The digital dynamometer verses a gauge dynamometer could help eliminate human error and greater precision. There could also be three grip strengths performed pre-testing/adjusting and then taking the average along with three post-testing and another three 30 minutes post-testing and taking their averages. This much maximal grip testing could fatigue some participants. It is unknown when or if the dynamometer (a J-Tec manual analog type) used in this study had been calibrated.

Conclusion: This study should be repeated using a known calibrated dynamometer. Further, little training was given to the study partner measuring grip strength with the

dynamometer. It is possible that more consistent results may be found if a clinician performs the measurements with more experience in grip strength measurement using a calibrated dynamometer.

A more comprehensive subjective and objective pre and post-testing questionnaire and analysis should be developed to more accurately assess the change in wrist subluxations. It is commonly felt that the symptomatic patients would also benefit from wrist exercises, bracing, ergonomics, and surgery.

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