

# Applying the Model of Creative Ability to Patients with Diabetic Foot Problems

Marjolein Jansen BSc(OT), University of the Witwatersrand, DHT, University of Pretoria

Occupational therapist at the Rehabilitation and Functional Assessment, Joint Venture between AngloGold Ashanti and Anglo Platinum

Daleen Casteleijn MOcc Ther, University of Pretoria

Senior Lecturer, University of the Witwatersrand

## ABSTRACT

Motivation is recognised as an important factor in the treatment of any patient<sup>1,2</sup>. There has been an increase in the number of people diagnosed with diabetes, and, thus an increase in the number of people with foot complications as a result of diabetes. Motivation has been identified as a factor contributing to the treatment outcomes of a person with this type of problem<sup>3,4,5,6,7</sup>, and an assessment into the level of motivation is recommended in the context of this condition. Currently, an assessment of motivation has not been sufficiently investigated.

The Model of Creative Ability (MCA) provides a framework within which to assess intrinsic motivation and principles with which to treat a patient, based on the determined level of motivation, also referred to as levels of creative ability<sup>1,2,8</sup>. The purpose of this study was to investigate whether occupational therapy, tailored to the level of motivation, for patients with diabetic foot complications, has more positive treatment outcomes than occupational therapy that is not.

A programme was therefore carried out in which two groups of patients were treated, an experimental group receiving intervention according to level of motivation and a control group.

In spite of a small sample size, the results of the research indicated a more positive outcome when occupational therapy was tailored using the MCA, for patients suffering from diabetic foot complications.

**Key words/phrases:** Motivation, Model of Creative Ability, diabetes, diabetic foot, quality of life, occupational therapy

## Introduction

There has been an increase in the number of people suffering from diabetes, especially Type 2 Diabetes and consequently an increase in the complications associated with diabetes<sup>3,9,10,11</sup> both acute and chronic. Despite advances in technology and in the treatment of diabetes, most experts agree that the diabetic foot remains one of the most challenging complications of diabetes facing health care workers<sup>3,9,10,11,12</sup>.

The diabetic foot is the leading cause of non-traumatic amputations worldwide<sup>13</sup>. The diabetic foot is a complex problem, with a multi-factorial origin. Between 10 and 15% of all people diagnosed with diabetes, will require an amputation, and of these approximately 50% will face a second amputation within three years, due to the progressive nature of the disease<sup>7,11,12,14,15,16,17</sup>.

The term 'diabetic foot' is an umbrella term that includes all problems that occur in the feet of people, as a result of diabetes. These problems include neuropathy, vascular changes and ulceration<sup>3,7,9,10</sup>. The tragedy is that the diabetic foot is one of the most preventable long-term complications of diabetes<sup>13,14</sup>.

Several studies have found that the diabetic foot negatively affects the quality of life of not only the patient, but also the patient's family and caregivers<sup>14,15,16</sup>. The functional implications of this condition include poor mobility in and around the community which

results in limited participation in leisure, social and work activities. Execution of personal management tasks e.g. washing, preparing meals and home maintenance could also be limited. This limited performance in executing roles and responsibilities then puts a burden on the family and caregivers.

Research by Price suggested that if patients suffering with diabetic foot problems are treated at a specialised multidisciplinary foot care clinic, their quality of life improved if they received education and treatment for their foot problems<sup>18</sup>. He also found that attendance at specialised, multidisciplinary clinics decreased the rate of foot ulceration and amputation by as much as 50%.

The benefit of rehabilitation therapists, including occupational therapists, treating people with chronic diseases such as diabetes has been reported by Rijken and Dekker<sup>19</sup>, Yawn<sup>20</sup> and Driessen, Dekker, Lankhorst and Van der Zee<sup>21</sup>. In chronic diseases, the efficacy of medical treatment is usually limited. An occupational therapist thus shifts the focus from recovery of the disease to maintenance of functional health and reducing the negative consequences of a chronic disease<sup>19,20,22</sup>.

Occupational therapists are often involved in the treatment of patients with diabetes and its complications. However, at the time of the research, no guidelines or protocols could be found in Medline, Google Scholar, PubMed, OVID or OTSeeker for the treatment of



persons with diabetes by occupational therapists, possibly making treatment of these patients controversial<sup>23</sup>.

Occupational therapists are often consulted in the treatment of patients once an amputation has occurred, as a result of a diabetic foot problem. The aims of treatment, in such cases, are usually to make the patient as independent as possible, to facilitate return to previous roles and responsibilities, and to provide education to prevent further injury or amputation<sup>24</sup> all of which is referred to as "treatment as usual" in this paper (for details see research methods).

Education in the care of diabetic feet has been shown to reduce and prevent further complications and amputation<sup>4,5,7,17,25,26,27,28,29,30</sup>. Authors also agree that the most important role player in the foot care team is the patient himself<sup>4,13,26,27,31</sup>.

Authors such as McDermott<sup>4</sup>, Faris<sup>6</sup> and Reiber<sup>28</sup> and Edmonds et al<sup>5,29</sup> believe that, in order to fully benefit from the multi-disciplinary team setting, motivation is one of the essential elements that patients must possess for them to adhere to the treatment regimes and follow the advice and education received in a clinic set up<sup>5</sup>.

Motivation is a cornerstone of occupational therapy and it is accepted that in order to participate in any activity, including the care of a diabetic foot, a person must be motivated<sup>2,8</sup>. Occupational therapists in South Africa widely use Du Toit's Model of Creative Ability (MCA) which provides a means to measure the level of motivation as observed in the actions or behaviours of the person. This model also provides treatment guidelines based on the level of motivation and action of the patient<sup>1</sup>.

The Model of Human Occupation (MOHO), developed by Kielhofner is the other model that is used as a framework within which motivation is addressed. The MOHO is well documented and researched, whereas the MCA urgently requires further research, the researcher thus chose to investigate the MCA and contribute to the body of knowledge on this model<sup>1,2,8</sup>.

Accurate assessment is crucial for the occupational therapist. If the level of motivation of a patient according to creative ability theory can be established, it provides a guideline to the occupational therapist in the health care team about the starting point of treatment as well as appropriate and purposeful activities for patient treatment.

Although no research has been conducted to date on the relationship between the levels of motivation and action described by Du Toit and the treatment of the diabetic foot, the work by McDermott<sup>4</sup>, Faris<sup>6</sup> and Reiber<sup>28</sup> infers that by addressing motivation all treatment outcomes will be enhanced.

Occupational therapists, who use the MCA, have the skills and knowledge to describe motivation in qualitatively different levels<sup>1,2,8,32</sup>. By looking at a patient's behaviour and observable level of action, a conclusion can be drawn about the level of motivation. Occupational therapists use purposeful and meaningful activities to engage and assess patients. While observing aspects such as problem solving abilities, understanding of the task, use of tools and materials, interest shown in the activity and decision making. It is from these observations, that the occupational therapist is able to draw some conclusions about the patient's level of action and thus determine a patient's level of motivation<sup>1,2,8,32</sup>. Thus the occupational therapist is able to provide treatment tailored according to the level of motivation. The successful treatment of any patient including a patient with diabetic foot complications depends, partly, on tailoring treatment according to the patient's needs and motivation. The question is therefore whether these skills possessed by occupational therapists could be used in the treatment of patients with diabetic foot complications?

## Research Question

Does an occupational therapy programme tailored by the MCA achieve better treatment outcomes as compared to a traditional occupational therapy treatment (treatment as usual) regime for patients with diabetic foot problems?

The null hypothesis stated that tailoring the occupational therapy treatment of patients with a diabetic foot ulcer according to Du Toit's MCA will not lead to more positive treatment outcomes than

treatment as usual.

Positive treatment outcomes in this research were defined as: percentage change in ulcer size and change in quality of life.

## Research Setting

The Diabetic Foot Clinic at Pretoria Academic Hospital (PAH) takes place once a week. As the clinic is run at a tertiary level hospital, specialist investigations and access to other specialist doctors, such as neurologists or physicians, were readily available. Once at the Diabetic Foot Clinic, a patient is seen by the doctor (a general surgeon), in consultation with a wound care sister and the occupational therapist. A physiotherapist is also available on a consultation basis. Patients' medical treatment is discussed and planned by the doctor and wound care sister, and is dependant on the severity of the patients' condition, the patients' needs and the available resources.

## Methodology

A quantitative research design was chosen to test the hypothesis for this research. The specific design used was an experimental pre-test-post-test design with an experimental and control group<sup>33</sup>. The researcher chose this design as the use of an experimental design within quantitative research allows one to accept or reject the null hypothesis.

Pre-test and post-test assessments were administered to both groups. These assessments consisted of the assessment of the subject's quality of life using the Reintegration to Normal Living Index (RNLI)<sup>34,35</sup>, a wound tracing to determine the size of the ulcer and the establishment of the subject's level of motivation, using the Creative Participation Assessment (CPA)<sup>1,8</sup>. The first author, who was the researcher, administered the RNLI and the CPA to all the research subjects. The doctor completed the wound tracing and was blinded to the assignment of subjects into either the experimental or control group. The experimental group then received a tailored occupational therapy treatment programme based on the MCA and the control group received treatment as usual<sup>36,37</sup>.

## Measurement Instruments

### □ Reintegration to Normal Living Index

Helping patients to have a better quality of life is an important aspect of intervention, particularly when dealing with a disease that cannot be cured, and where treatment focuses more on controlling the disease process and compensating for loss of function. The RNLI was developed by Wood-Dauphinee and Williams as a proxy to quality of life and its content is similar to global quality of life assessments<sup>34</sup>. Reintegration to normal living is closely linked to functional performance, one of the key aspects of occupational therapy.

The RNLI consists of 11 items each of which are scored on a 10 point visual analogue scale. The final score of the RNLI is converted to a score out of 100 for ease of interpretation<sup>34,35,38</sup>. The RNLI has been found to have adequate inter-rater reliability for significant others and patients ( $r=0.62$ )<sup>34,35</sup>, and high internal consistency (Chronbach's alpha above 0.90)<sup>34,35</sup>. Content validity was also obtained. These results were established for patients with chronic conditions such as cancer, myocardial infarcts and diabetes<sup>35</sup>.

### □ Wound Tracing

The ultimate aim of the Diabetic Foot Clinic is to heal any ulcers that patients may present with. The rate of wound healing in a diabetic patient is often significantly impaired<sup>4</sup>, making measuring of healing difficult and often frustrating for the patient and health care professionals. To obtain an accurate measurement of the size of the subjects' ulcers, the ulcers' perimeter measurement was taken. This was done by placing a piece of clear sterile plastic sheeting over the ulcer and then tracing around the border of the ulcer. Using a sheet of carbon paper, the "image" of the ulcer was then transferred onto paper, and the plastic sheeting and carbon paper discarded. A grid was then placed over the "image" of the ulcer and the exact size



of the ulcer was calculated in square millimetres<sup>39</sup>. It has been found that wound tracing yields more reproducible results than simply measuring the length and width of an ulcer<sup>39</sup>. The ulcer measurement was compared pre- and post test in order to determine the percentage change in ulcer size. The wound tracing was completed by the clinic doctor.

From retrospective clinic data, it was found that the expected reduction in the size of an ulcer is 50% in a three month period, with a standard deviation of 29.3%. For a clinically significant improvement in ulcer size, as a result of tailored occupational therapy treatment, a further 50% reduction in ulcer size was expected. In other words, a 75% reduction was thought to be clinically significant in the experimental group and a 50% reduction in the control group.

#### ❑ Creative Participation Assessment

To determine a subject's level of motivation, the CPA was used.<sup>2</sup> The CPA was developed by Van der Reyden as an assessment for motivation. It is a one-page tick-off sheet with twelve items that are to be observed and scored on an ordinal scale of 1 to 7<sup>8</sup>. Casteleijn found that the CPA is a reliable measurement tool for patients suffering from schizophrenia (Cronbach's alpha of 0.9960)<sup>1,2,8</sup>. The researcher acknowledges that the validity of the CPA has not been established for use with patients with diabetic foot ulcers; however, as motivation is core to a person's ability to function, it can be assessed irrespective of diagnosis. To accurately assess a subject's level of motivation using the CPA, at least three activities are necessary<sup>32</sup>. The researcher thus assessed each subject with the use of a self-care activity, a tea making activity and a table top game. These activities allowed the researcher to observe the subjects in a variety of situations including familiar and unfamiliar activities.

### Data Collection

Ethical clearance was obtained from the University of Pretoria's Research Ethics Committee and data collection commenced in March 2007. The first phase of the data collection process lasted approximately nine months, and during this time subjects were recruited for the research from the Diabetic Foot Clinic at PAH.

Using the assumptions explained earlier regarding clinically significant ulcer healing, a sample size of 16 subjects per group would have had the power of 90% to detect a difference (improvement) of 25 percentage points between the two groups, with respect to ulcer healing, if the testing was one sided at a significance level of 0.1. A significance level of 90% is often seen as acceptable in the social sciences<sup>40</sup>. The researcher thus aimed to recruit at least 18 subjects per group. Patients attending the diabetic foot clinic were approached to participate in the research study if they met the following inclusion and exclusion criteria:

#### Inclusion Criteria:

- ❖ Patients attending the PAH Diabetic Foot Clinic
- ❖ Patients with diabetic foot ulcerations
- ❖ Patients with new or previously untreated diabetic foot ulcers

#### Exclusion Criteria:

- ❖ Patients with healed ulcers or healed amputations
- ❖ Patients with ulcers not related to the complications of diabetes

The subjects agreed to participate in the research through signed informed consent.

Once the initial assessment was complete (wound tracing, quality of life measurement and assessment of level of motivation), subjects were alternately assigned to the experimental or the control group as they were referred to occupational therapy. The experimental and control group were paired by the researcher for the level of motivation in an attempt to have equal representation of the different levels of motivation in each group.

### Treatment

Subjects were booked for a follow up clinic visit two weeks after the initial assessment. Treatment started and continued for three months as this was the period of time in which significant ulcer

healing (50% decrease in ulcer size) could occur.

The subjects in the experimental group received the tailored occupational therapy treatment, while subjects in the control group continued to receive treatment as usual. The researcher thus treated both the experimental and the control group. This made the researcher a constant variable, and thus only the type of treatment received by subjects changed. However the researcher could have introduced some bias to the results.

At the time of the research, treatment as usual consisted of:

- ❑ Handing the patient a written exercise programme to improve mobility and blood circulation and to maintain range of motion in preparation to do personal management tasks and move around in and around the community. These exercises were demonstrated to them.
- ❑ Educating the patient about foot care (as part of hygiene and personal management) using a pamphlet.
- ❑ Assessing the use of assistive devices, modifying the device if necessary and ordering any other necessary assistive devices.
- ❑ Reinforcing treatment prescribed by the doctor and other team members.

Although this was the standard treatment that was being offered to patients at the Diabetic Foot Clinic at the time of the research, the effectiveness of this treatment had not been investigated. Treatment was very general, and not tailored to the individual patient. Treatment focussed on education and on addressing any problems that the patient raised. The aim of the exercise programme was to improve mobility and thus independence in activities of daily living. The same is true of the education about foot care.

The tailored occupational therapy treatment consisted of similar information and activities. However it was presented to the patient based on their level of motivation using the principles prescribed in the MCA. *Tables 1a to 1d* on pages 29-30 present the principles that are prescribed by the MCA. Please note that due to space limitations only principles of the two levels of motivation that occurred most frequently in this research are presented here.

The information given to the subjects was planned beforehand and a different topic was covered in each session. The topics were:

- ❑ *Education regarding what is a 'diabetic foot' and how the ulcer developed.* If the patient was on a passive participation level, the researcher would provide most of the information in a structured and well illustrated manner. Patients on imitative participation received less structure in the session and were encouraged to read up and access additional information in their own time.
- ❑ *Education about and execution of correct foot hygiene and nail care.* The passive participation patient would again receive more support and detailed illustration of basic foot hygiene while those on level of imitative participation were encouraged to imitate more refined forms of foot and nail care.
- ❑ *Education about correct shoe wear and compensation for loss of sensation.* Patients on imitative participation received feedback on new ways of compensating for sensory loss while those on passive participation were not expected to find ways other than those in which they had received instruction.
- ❑ *Adaptation to daily routine at home/work and discussion about mobility difficulties.* The imitative participation patients usually have the ability to adapt their routine independently and would ask for advice only occasionally from the therapist whilst the passive participation patient were given a structured routine by the therapist.

Patients were also engaged in activities that were relevant to their treatment; these included mobility exercises, activities such as basic foot and nail care, basic activities of daily living and mobility.

In order to ensure that an effective and accurate treatment programme was drawn up, an expert in the MCA was consulted for assistance and guidance.

It is important to note that during the research process, subjects continued to receive treatment from the other members of the



Table Ia: Level of Motivation and Action: Passive Participation

Personal Management	Social Ability	Work Ability	Use of free time
<ul style="list-style-type: none"> <li>Interests and experimentation in refined forms of self care develop</li> <li>Poor prevocational skills influence quality of all work</li> <li>Survival skills are the main focus</li> <li>Express want for independence, but need structure and supervision</li> </ul>	<ul style="list-style-type: none"> <li>Interpersonal activity is directed towards belonging</li> <li>Assertiveness skills start to develop</li> <li>Prefer spectator role</li> <li>Relationships generally egocentric</li> </ul>	<ul style="list-style-type: none"> <li>Behaviour is more product centred</li> <li>Difficulty initiating activities, but have desire to complete</li> <li>External locus of control and poor prevocational skills</li> <li>Able to deal with obstacles</li> </ul>	<ul style="list-style-type: none"> <li>Range of interests develop</li> <li>Will actively participate with others if encouraged/organised</li> </ul>
Treatment Principles			
Handling	Structuring	Presentation	Activity requirements
<ul style="list-style-type: none"> <li>Handle with care and understanding</li> <li>Make aware of norms</li> <li>Encourage patient to get involved in all steps of activity</li> <li>Encourage evaluation of participation and activity</li> <li>Encourage participation even if passive</li> </ul>	<ul style="list-style-type: none"> <li>Area structured according to patients ability to concentrate</li> <li>Preparation done by therapist</li> <li>Accepting atmosphere</li> </ul>	<ul style="list-style-type: none"> <li>Treatment should be task centred and socio-emotional</li> <li>Needs instructions in order to monitor progress</li> <li>Difficulty handling negative feedback therefore focus of properties of activity</li> </ul>	<ul style="list-style-type: none"> <li>Concrete, experimental and challenging activity</li> <li>Guaranteed success in activity but with room for improvement</li> <li>Activity must not require patient to take initiative</li> </ul>

Table Ib: Treatment Programme for Patients with Diabetic Foot Problem – Passive Participation

Week 1	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
<ul style="list-style-type: none"> <li>Obtain informed consent</li> <li>Assess level of CA using CPA</li> <li>Measure size of ulcer</li> <li>Complete RNLI</li> </ul>	Education regarding what is a diabetic foot and how did the ulcer develop	Recap of treatment 1  Education and execution of correct foot cleaning, washing, inspection and nail care	Recap of treatment 1 & 2  Education about correct shoe wear	Recap of treatment 1, 2 & 3  Education about and practical execution of principles to compensate for loss of sensation	Recap of treatment 1, 2, 3 & 4  Adaptation to daily routine at home and/or work	<ul style="list-style-type: none"> <li>Reassessment of level of CA using CPA</li> <li>Measurement of size of ulcer</li> <li>Completion of RNLI</li> </ul>

foot care team. All other team members were blinded as to which subjects were in the experimental group and could thus not influence results. They continued to offer the most applicable medical and nursing care for each subject.

After the three month period, the subjects were all reassessed, using the same procedure that was followed for the pre-test assessment.

### Discussion of Results

The sample that was recruited for this research project consisted of 16 subjects in total. Selected subjects were randomly assigned to experimental and control groups, using stratified random assignment based on the level of motivation. The experimental group consisted of seven subjects and the control group of nine subjects. During the course of the data collection, four subjects (one from the experimental group and three from the control group) defaulted on their treatment and two (both from the control group) underwent amputation due to the severity of the ulcers. The experimental group finally consisted of six subjects and the control group of four subjects. Thus the final sample size was ten subjects. Table II on page 31 shows the constitution of the experimental and control groups, and Table III shows the results of the research.

As can be seen from Table III on page 31 all subjects who completed the research underwent a reduction in ulcer size, as expected. The results of the quality of life measure (RNLI score) were not as consistent, and five of the ten subjects (three in the experimental group and two in the control group) had lower quality of life scores post test than pre test. This is not what the researcher expected to find, as an overall increase in quality of life was expected. Analyses of the RNLI in studies done by Wood-Dauphinee and Williams have addressed the property of sensitivity to change over time<sup>34,35</sup>. These results indicate that two thirds of clients will have a positive change by at least two points on at least two items over a three month period<sup>34, 35</sup>.

In terms of the levels of motivation, five out of ten subjects had progressed in the levels after the treatment (four in the experimental group and one in the control group). The remaining five subjects' levels of motivation remained unchanged. This is in keeping with the expectations on which the research design was based. The MCA describes how occupational performance develops along a continuum from egocentricity to contribution to society. This development starts at birth and continues throughout life. Development is usually progressive, but need not always be so. Development is not always consistent and may occur in spurts with long periods of



Table 1c: Level of Motivation and Action: Imitative Participation

Personal Management	Work Ability	Social Ability	Use of Free Time
<ul style="list-style-type: none"> <li>Basic hygiene and care of clothes and belongings is consolidated</li> <li>Develop awareness of fashion and suitability of clothing</li> <li>Survival skills and skills for independent living are the focus at this stage</li> <li>Difficulty handling stress associated with being responsible for self</li> </ul>	<ul style="list-style-type: none"> <li>Performance is goal directed and norm compliant</li> <li>Able to do what is asked provided that there are no unexpected hitches and problem solving required is minimal</li> <li>Prevocational skills are good</li> <li>Vocational skills are developing with training</li> </ul>	<ul style="list-style-type: none"> <li>Behaviour is directed towards belonging</li> <li>Communication is efficient and basic social skills are intact</li> <li>Assertiveness is poor</li> <li>Function well in familiar settings but struggle with unfamiliar settings</li> <li>Susceptible to group pressure</li> <li>Prefer to follow rather than lead</li> </ul>	<ul style="list-style-type: none"> <li>Wide variety of interests and recreational skills</li> <li>Involved in activities that are currently fashionable and done by group members/friends</li> </ul>
Treatment Principles			
Handling	Structuring	Presentation	Activity Requirements
<ul style="list-style-type: none"> <li>Relationships based on mutual respect and trust, with elements of give and take</li> <li>Handle firmly with regard to norm-compliance</li> <li>Expectations must be clearly stated and generalised to other situations</li> <li>Establish goals and norms together</li> <li>Be supportive if unable to comply</li> </ul>	<ul style="list-style-type: none"> <li>Patient should be encouraged to structure own working space</li> <li>Treatment should happen in groups</li> <li>Patient given responsibility for attendance</li> </ul>	<ul style="list-style-type: none"> <li>Activities presented as a whole</li> <li>Use of verbal and diagrammatic instructions with unfamiliar activities only</li> <li>Emphasis on purpose and understanding of activities</li> <li>High level end product should be available for comparison</li> <li>Encourage critical evaluation of the end product</li> <li>Present activities in logical fashion, outline method/ technique</li> </ul>	<ul style="list-style-type: none"> <li>Introduce elements of problem solving</li> <li>Should challenge patient to use initiative</li> <li>Allow patient to start showing individuality</li> </ul>

Table 1d: Treatment Programme for Patients with Diabetic Foot Problem – Imitative Participation

Week 1	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
<ul style="list-style-type: none"> <li>Obtain informed consent</li> <li>Assess level of CA using CPA</li> <li>Measure size of ulcer</li> <li>Complete RNLI</li> </ul>	Education regarding what is a diabetic foot and how did the ulcer develop	Recap of treatment 1  Education and execution of correct foot cleaning, washing, inspection and nail care	Recap of treatment 1 & 2  Education about correct shoe wear	Recap of treatment 1, 2 & 3  Education about and practical execution of principles to compensate for loss of sensation	Recap of treatment 1, 2, 3 & 4  Adaptation to daily routine at home and/or work	<ul style="list-style-type: none"> <li>Reassessment of level of CA using CPA</li> <li>Measurement of size of ulcer</li> <li>Completion of RNLI</li> </ul>

consolidation in between<sup>32</sup>. Regression is also possible. The results of the research thus fall within the expectations based on the MCA.

Statistical analysis was performed on the data in order to ascertain whether there was a statistically significant difference between the experimental and control groups. The SAS software programme was used to perform the analysis. The outcome of this analysis determined whether or not the null hypothesis could be rejected and thus whether or not, tailored occupational therapy contributes to more positive treatment outcomes for patients with diabetic foot ulcers.

Comparing the experimental and control groups, with respect to percentage change in the area of the ulcer(s) adjusted for base-

line (pre treatment), the groups were not statistically significantly different (ANCOVA;  $p=0.1451$ ) ( $p$  significant at  $<0.1$ ); (88.1% versus 63.2%). In view of the small sample size, this analysis was repeated using a nonparametric ANCOVA and a similar result followed ( $p=0.1684$ ).

However, when the absolute change in ulcer size was considered (using a nonparametric ANCOVA), and adjusted for the baseline area, the experimental group did significantly better than the control group ( $p=0.0236$ ). Note that in the latter, use was made of ranks and mean ranks and thus the actual change or effect size was not reflected<sup>33</sup>.



Table II: Constitution of groups

	Experimental	Control
<b>Age Range</b>	63 – 75 years	48 – 81 years
<b>Mean Age</b>	67.8 years	57.7 years
<b>Number of Females</b>	2	0
<b>Number of Males</b>	4	4

Table III: Results of the research

Experimental Group							
Subject	Pre test ulcer size (mm <sup>2</sup> )	Post test ulcer size (mm <sup>2</sup> )	Percentage change in ulcer size	Pre test RNLI score (%)	Post test RNLI score (%)	Pre test level of motivation	Post test level of motivation
1	68	12	82.4	77	77.3	Passive participation, therapist directed	Imitative participation, therapist directed
2	222	0	100	72	86.4	Imitative participation, therapist directed	Imitative participation, patient directed
3*	652			72.7		Imitative participation, patient directed	
4	752	318	57.7	52.7	55.5	Passive participation, patient directed	Passive participation, transitional
5	168	16	90.4	100	99	Imitative participation, transitional	Imitative participation, transitional
6	276	8	97.1	73	71	Passive participation, patient directed	Passive participation, transitional
7	380	0	100	85	79	Imitative participation, patient directed	Imitative participation, patient directed
Control Group							
8*	206			49		Passive participation, therapist directed	
9	190	42	77.9	72	69	Passive participation, patient directed	Passive participation, patient directed
10*	104			58.2		Passive participation, patient directed	
11*	510			83.6		Imitative participation, patient directed	
12	382	20	94.5	80	92	Imitative participation, patient directed	Imitative participation, transitional
13*	244			82.7		Passive participation, transitional	
14	56	32	42.9	51	46	Self presentation, transitional	Self presentation, transitional
15*	204			44.5		Passive participation, patient directed	
16	106	64	39.6	58	93.6	Imitative participation, patient directed	Imitative participation, patient directed

The above subjects either defaulted on their treatment during the course of the research, or underwent amputations due to the severity of the ulcers. Subjects 8 and 15 underwent amputations, while subjects 3, 10, 11 and 13 defaulted.

With respect to the quality of life score, obtained from the RNLI, adjusted for baseline, groups did not differ significantly (ANCOVA;  $p=0.4829$ ; 2.4 versus 9.3). One possible reason for this result is that the post test RNLI score for Subject 16 differs from his pre test score by 35.6%. In a small group (four subjects) such an extreme change can affect the results of the entire group, thus possibly affecting statistically significant results.

As can be seen from the above analysis, the ability to infer findings from the sample to the population is limited largely due to the small sample size used in this research and the resultant limitations in data analysis. As a profession, occupational therapy has often been confronted with the challenge of confirming or establishing the best therapy. A practice that is rapidly increasing as the demand for best evidence based practice increases<sup>41,42</sup>. The effect that small



samples have on results of research has been well described and is perhaps material for another article.

In summary, it was found that rejection of the null hypothesis is not possible as there is not a statistically significant difference between the experimental and control groups when examining pre- and post test ulcer size and change in quality of life scores. However the data analysis did reveal a trend that indicates that tailored occupational therapy improves treatment outcomes, when the data was analysed using a non-parametric analysis of covariance, for the absolute change in ulcer size as opposed to the percentage change in ulcer size. With this analysis, a significant difference was found at a p value of 0.0236. These results indicate a positive trend towards more positive treatment outcomes when treating patients with diabetic foot complications with occupational therapy that is tailored to the level of motivation, as opposed to occupational therapy that is not tailored.

## Conclusion and Recommendations

This research study set out to investigate whether or not tailoring occupational therapy according to a client's level of motivation resulted in more positive treatment outcomes than therapy that is not tailored. Specifically the research looked at clients with diabetic foot complications.

As can be seen from the results, the inferences that can be made from this research are limited largely due to the small sample size that was used. The difficulties in obtaining large samples to study in occupational therapy are well documented and there are several authors who believe that there is merit in research that is conducted with small samples, despite the preference of many professionals for clinical trials with large samples<sup>41,43, 44</sup>.

It is important to acknowledge the positive trend that was identified in this research study, indicating that tailored occupational therapy gives more positive treatment outcomes than therapy that is not tailored. The researcher thus recommends that further research be done to investigate this trend in more detail. The fact that the researcher was the constant variable in conducting the treatment for both the experimental and control group may have resulted in biases in the results. In future research it is recommended that different therapists conduct the treatment for the two groups. At the time of this research, no other therapists were available due to staff shortages.

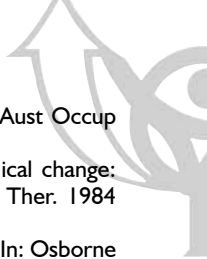
The importance of research into the MCA should also not be underestimated. At present the model is not well documented, but is a uniquely South African contribution to the field of occupational therapy. If the model is not better researched and documented, it is at risk of perishing and being replaced by models that are better researched, but not necessarily the most appropriate for clinical situations. It is felt that this research study contributed to the treatment of diabetic foot patients as well as the body of knowledge on the MCA.

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## Corresponding Author

**Marjolein Jansen**

PO Box 8619

Edenglen

1613

South Africa

Email: [mjansen@anglogoldashanti.com](mailto:mjansen@anglogoldashanti.com)