

# **Buerger Allen Exercise for Type 2 Diabetes Mellitus Foot Ulcer Patients**

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**ABSTRACT:** The study was aimed at evaluating the effectiveness of Buerger Allen exercise on wound healing process among Type 2 Diabetic foot ulcer patients. Quasi experimental pre – test post – test control design was adopted and Non probability purposive sampling technique was used to select the samples. A total of 60 Type 2 diabetes mellitus patient with foot ulcer has been taken from Rajiv Gandhi Government General Hospital, Chennai, and the Buerger Allen exercise was practiced for the selected samples. Condition of the foot ulcer was analyzed before and after the study. Collected data was analyzed using descriptive and inferential statistics. A high significant On an average, in experimental group, diabetic patients are having 24.6 % improved wound healing where as in control group, on an average, diabetic patients are having only 5.3 % wound healing.

**KEYWORDS:** Effectiveness, wound assessment, wound healing, Buerger Allen exercise

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## **I. INTRODUCTION**

Healthy life is the valuable gift of an individual, if a person is healthy enough according to me he is the richest person in his own world. But there are certain disease condition which affects the normalcy of many a people in our existing world, such as heart problems, neurological problems, orthopedic problems, metabolic disorders especially diabetes mellitus, etc., among which diabetes is the one of the important health issue in today's world which may affect the entire life pattern of an individual. Diabetes is a global public health problem; it is a chronic disease and is now growing as an epidemic in both developed and developing countries. The diabetes mellitus (DM) is a group of metabolic disorder of multiple etiologies characterized by hyperglycemia and micro vascular, macro vascular and neuropathic complications, with disturbances of carbohydrate, fat and protein metabolism resulting from resulting from defect in insulin secretion, insulin action or both, Type 2 DM is the commonest form of diabetes constituting 90% the diabetes population. The global prevalence of DM is estimated to increase from 4% in 1995 to 5.4 % by the year of 2025. The world health organization has predicted that the major burden will occur in developing countries (84-228 million). The prevalence of micro and macro vascular complications more in Asian are 66.4% and it is 44.2% more than European populations. Among these macro vascular complications accounts for 27.8%. The benefits of exercise for the diabetic population especially with type 2 diabetes are very beneficial one. Doing exercise will help the patient to improve the vascularization and at the same time it will help to improve the wound healing process. Performing Buerger Allen exercise for diabetic foot ulcer is the one of the way to improve the vascularity and thus promotes wound healing process.

**STATEMENT OF THE PROBLEM:** A study to assess the effectiveness of Buerger - Allen exercise on wound healing process among the diabetic foot ulcer patients admitted in Diabetology Department at Rajiv Gandhi Government General Hospital, Chennai - 03.

## **HYPOTHESIS**

**H 1:** There will be a significant difference between the pre test and post test interventional scores regarding the lower extremity perfusion among diabetics patient of control group.

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**H2:** There will be a significant difference between the pre test and post test interventional scores regarding the lower extremity perfusion among diabetic patient of experimental group on administering Buerger- Allen exercise.

**H3:** There will be a significant difference between pre and post interventional score on Buerger Allen exercise on improving lower extremity perfusion among experimental and control group.

**H4:** There will be significant association between interventional scores with Selected demographic variables.

## OBJECTIVES:

- To assess the lower extremity perfusion among diabetes mellitus patient in experimental and control group.
- To evaluate the effectiveness of Buerger- Allen exercise on wound healing process among the experimental group.
- To compare the wound healing process between the experimental and control group.
- To find out the association between wound healing process and Buerger- Allen exercise with selected demographic variables among experimental group.

## II. MATERIALS AND METHODS

Hence, this study was undertaken to determine the effectiveness of performing Buerger Allen exercise to promote wound healing process among the type 2 diabetic patients with foot ulcer at the Diabetology department at Rajiv Gandhi Government General Hospital Chennai- 3. The tool used for data collection was validated by the experts in the department of Medical & Surgical Nursing. Reliability of the tool was assessed by using inter rater reliability correlation coefficient. The instrument was found to be reliable. Quasi-experimental research design. Non probability Convenient sampling technique was used to select 60 samples Pre assessment of the wound was done by using Wagner wound assessment scale and the characteristics of the foot ulcer was pre assessed with help of wound assessment check list in both experimental and control group on first day. Control group received their routine treatment. The wound assessment was done on every fifth day during the intervention period. Post assessment of the wound of the foot ulcer was done with the same check list the fifteenth day. The evidence of intervention and wound healing were marked. Intervention was done at the bedside. Descriptive (percentage distribution, mean, standard deviation) and inferential statistics (t- test, chi square test) were used to analyze the data and to assessment hypothesis. The data were then interpreted and discussed based on the objectives of the study, hypotheses and relevant studies from literature reviewed. The data was analyzed and the result of the study revealed that, the correlation coefficient  $r$  – value is 0.82. Therefore it was highly effective of performing Buerger Allen exercise among patients having foot ulcer with Type 2 diabetes mellitus. It promotes their health condition positively. Analysis of the study showed positive correlation between wound healing of diabetic foot ulcer and Buerger Allen exercise.

## III. RESULTS AND DISCUSSION

The Quasi-experimental research design with Non probability Convenient sampling technique was used to evaluate the effectiveness of using Buerger Allen exercise on wound healing process among patients with Type 2 diabetic foot ulcer.

In pre assessment among the experimental group, while comparing the size of the wound on day 1, 76.7 % (23) of them shown the wound size of Length X Width  $< 4 - 16$  sq cm but on day 15 it came down to 30.0 % (9), and 70.0 % (21) are showing the wound size of Length X Width  $< 4$  sq cm. In comparison of depth of wound, on day 1, 60.0 % (18) are shown superficial, abrasion and shallow blisters, but on day 15 it came down to 26.7 % (8), and 73.3 % (22) are shown no break in the skin. During comparison of edges, on day 1, hyperkeratosis, callous formation was seen in 56.7 % (17) and on day 15 it came down to 6.7 % (2). On comparison of undermining, 60.0 % (18) shown  $> 4$  cm on day 1, on day 15 it came down to 16.7 % (5). While comparing the necrotic tissue type on day 1 it was 53.3 % (16) shown adherent, hard and black eschar and on day 15, only 6.7 % (2), shown the same. While comparing necrotic tissue amount, on day 1, 53.3 % (16) shown  $> 50$  % and  $< 75$  % of wound coverage and on day 15, 63.3 % (19), shown  $< 25$  % wound bed coverage. While comparing the exudates type on day 1 nearly 70.0 % (21) shown serous, thin, watery or clear exudates and on day 15, 60.0 % (18) shown none of the exudates. While comparing the exudates amount on day 1 nearly 40.0 % (12) of them shown moderate exudates amount and on day 15, nearly 43.3 % (13) of them are showing scanty exudates. During comparing the skin colour on day 1, 13.3 % (4) are shown white or gray or hypopigmented skin colour but on day 15, 56.7% (17) shown the same. While considering the peripheral tissue edema,

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10.0 % (3), of them shown non pitting edema extends < 4 cm around wound, but on day 15, 66.7 % (20) are shown the same. While comparing peripheral tissue induration, 70.0 % (21) of them shown 2 – 4 cm extending > 50 % around the wound on day 1, but on day 15, 60.0 % (18) of them shown induration < 2 cm around the wound. While comparing granulation tissue 60.0 % (18) are shown pink or dusky red fills < 25 % of wound but on day 15 only 3.3 % (1) has shown the same. While comparing the epithelialisation on day 1, 70.0 % (21) of them shown 25 % to 50 % of wound coverage, but on day 15, 40.0 (12) % of them shown 75 % to 100 % of wound coverage.

**Table 19: EFFECTIVENESS OF BUERGER - ALLEN EXERCISE ON WOUND HEALING PROCESS AMONG THE DIABETIC FOOT ULCER PATIENTS**

	Max score	Pretest	Posttest	Mean difference with 95% CI	Percentage difference with 95%CI
<b>Experiment</b>	60	29.27	44.07	14.8(13.1-16.5)	↑ <b>24.6%(21.8%-27.5%)</b>
<b>Control</b>	60	28.90	32.07	3.2(2.2-4.2)	↑ <b>5.3%(3.7%-7.1%)</b>

On an average, in experimental group, patients are showing better wound healing is **24.6 %** where as in control group, it is only **5.3 %**. It shows the effectiveness of study. Differences between pretest and post test score was analysed using Mean difference with 95% CI and proportion with 95% CI and mean difference with 95% CI. **24.6% is the net benefit of this study.**

In pre assessment among the control group, while comparing the size of the wound on day 1, 73.3 % (22) of them shown the wound size of Length X Width < 4 – 16 sq cm but on day 15 it is been increased to 76.7 % (23), and 6.7 % (2) are showing the wound size of Length X Width < 4 sq cm. In comparison of depth of wound, on day 1, 73.3 % (22) are shown superficial, abrasion and shallow blisters, but on day 15 it is been raised to 73.3 % (22), and 13.3 % (4) are shown no break in the skin. During comparison of edges, on day 1 hyperkeratosis, callous formation was seen in 40.0 % (12) and on day 15 it was 46.7 % (14). On comparison of undermining, 46.7 % (14) shown > 4 cm on day 1, on day 15 it was 36.7 % (11). While comparing the necrotic tissue type on day 1, it was 73.3 % (22) shown adherent, hard and black eschar and on day 15, it was 43.3 % (13), shown the same. While comparing necrotic tissue amount, on day 1, 63.3 % (19) shown > 50 % and < 75 % of wound coverage and on day 15, 36.7 % (11), shown the same. While comparing the exudates type on day 1 nearly 70.0 % (21) shown serous, thin, watery or clear exudates and on day 15, 50.0 % (15) shown none of the exudates. While comparing the exudates amount on day 1 nearly 43.3 % (13) of them shown moderate exudates amount and on day 15, only 6.7 % (2) of them are showing scanty exudates. During comparing the skin colour on day 1, 3.3 % (1) are shown white or gray or hypopigmented skin colour but on day 15, 13.3% (4) shown the same. While considering the peripheral tissue edema, 13.3 % (4), of them shown non pitting edema extends > 4 cm around wound, but on day 15, 36.7 % (11) are shown the same. While comparing peripheral tissue induration, 73.3 % (22) of them shown 2 – 4 cm extending > 50 % around the wound on day 1, but on day 15, 3.3 % (1) of them shown induration < 2 cm around the wound. While comparing granulation tissue 76.7 % (23) are shown pink or dusky red fills < 25 % of wound but on day 15 only 46.7 % (14) has shown the same. While comparing the epithelialisation on day 1, 63.3 % (19) of them shown 25 % to 50 % of wound coverage, but on day 15, 10.0 (3) % of them shown 75 % to 100 % of wound coverage.

On an average, in experimental group, diabetic patients are having **24.6 % improved wound healing** where as in control group, on an average, diabetic patients are having only **5.3 % wound healing**. It shows the **effectiveness** of the study.

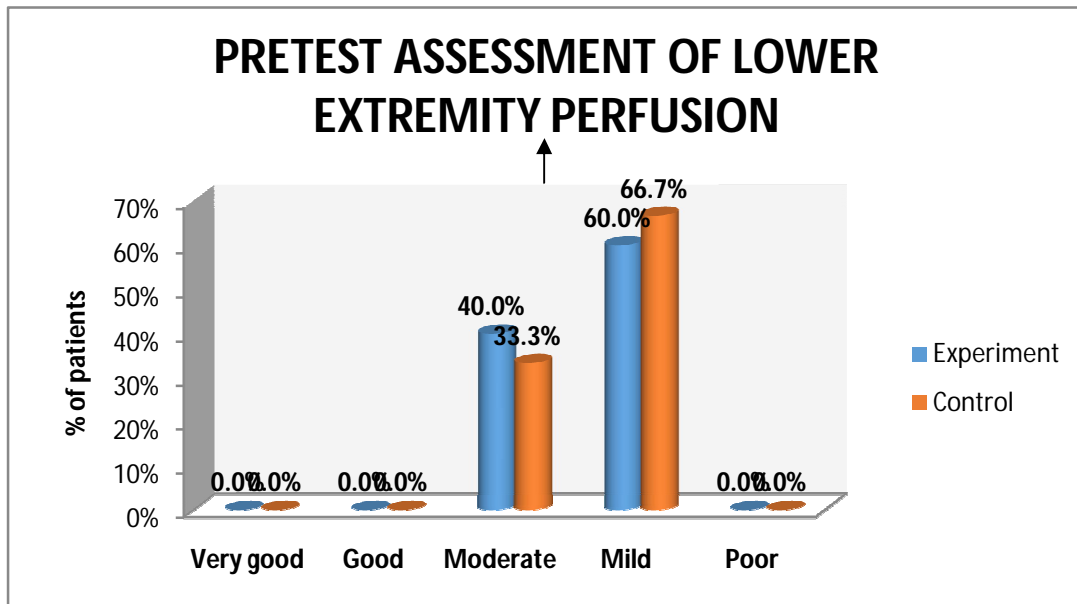


Fig - 14 Pretest Assessment of Lower extremity perfusion in experimental and control group

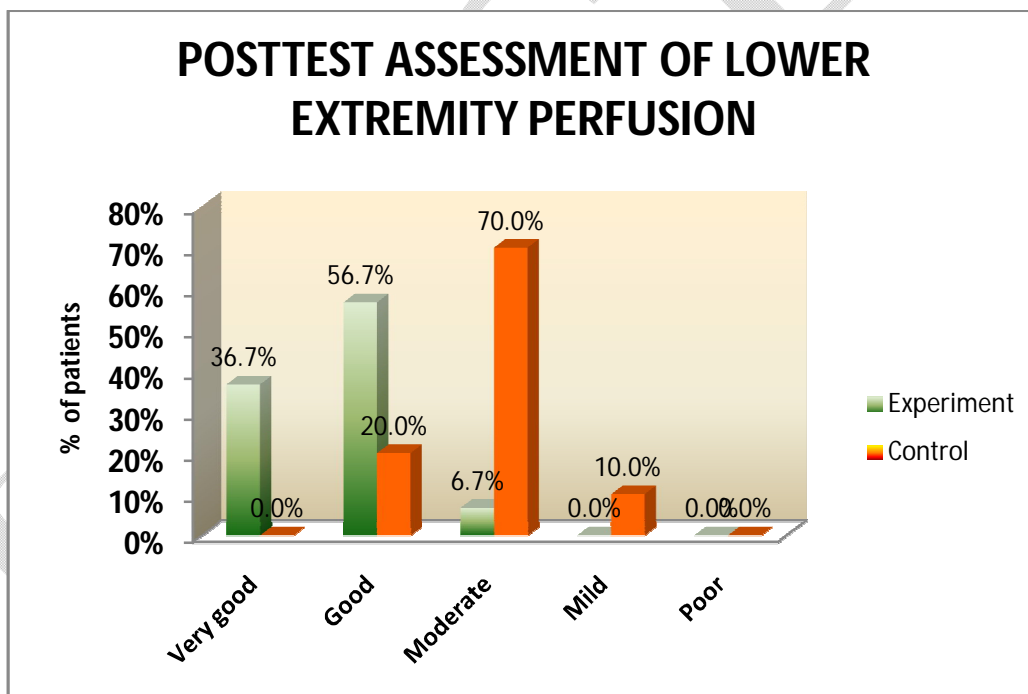


Fig - 15 Post test assessment of lower extremity perfusion in experimental and control group

#### IV. CONCLUSION

The study was found to be effective in experimental group on wound healing process among type 2 diabetic patients. All foot ulcer patients can adopt Buerger Allen exercise to ease faster wound healing.

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