

# A Study To Assess The Effectiveness Of Muscle Strengthening Exercises On Knee Joint Pain Among Elderly People In Selected Hospital At Chennai

Dominic Arockia Mary<sup>1</sup>, Dr. V. Jayanthi<sup>2</sup>, A.R. Bharathi<sup>3</sup>

<sup>1</sup>Ph.D. Scholar, Department Of Medical Surgical Nursingmeenakshi Academy Of Higher Education & Research Deemed To Be University, Chennai: 600078, Hod / Professor, Tagore College Of Nursing, Chennai, Tamil Nadu, India

<sup>2</sup>Principal Tagore College Of Nursing, Chennai, Tamil Nadu, India

<sup>3</sup>Principal, Peri College Of Nursing, Chennai, Tamil Nadu, India

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## ABSTRACT

**Background of the study:** Age related changes affect every body system. These changes are normal and occur as people age. Older people generally lose muscle strength as they age. This reduction in muscle strength and associated joint pain makes the older people more likely to have problems carrying out their daily activities. Muscle Strengthening exercises helps to reduce knee joint pain and improve the physical function, and increase the daily living activities.

**Aims and Objectives:** To assess the pretest and post-test level of severity of knee joint pain among elderly people, and to evaluate the effectiveness of muscle strengthening exercises, and to assess the correlation between the Numerical Rating scale (NRS), and the Modified WOMAC Index Scale, among elderly people, to associate the selected demographic variables with the pre-test and post-test intervention measures on the severity of knee joint pain among elderly people in selected hospitals in Chennai.

**Research Design and Methodology:** The study was conducted to evaluate the effectiveness of muscle strengthening exercises and it was found that out of 100 study participants who met with the inclusion criteria. Informed consent was obtained from all the study participants. The research design used was one group pre-test and post-test experimental design. The muscle strengthening exercises are practiced by samples for 30-45 minutes daily in the morning and evening for 30 days. The data gathered were analysed using descriptive and inferential statistics.

**Results:** The study revealed that, the mean post-test scores of knees joint pain was 1.68 (SD + 1.17) which was significantly lower than the mean pre-test scores 4.27(SD + 1.60). so, the reduction of pain score is 25.90%. It shows the effectiveness of the study. The mean post-test score of physical function was 11.28(SD + 9.07) which was significantly lower than the mean pre-test score of 30.10 (SD+ 10.09). So, the reduction of pain score was 19.60%. It shows the effectiveness of the study. The value of knee joint pain score was 40.65 and physical function score was 78.95 which were significant at < 0.001 level. Therefore, practicing muscle strengthening exercises reduces knee joint pain and improves physical function among elderly people with knee joint pain which is non-expensive.

**Conclusion:** The study findings revealed that there was a significant reduction of joint pain and improved physical function after muscle strengthening exercises. Based on the statistical findings it was evident that muscle strengthening exercises reduce the joint pain and improve physical function, and increase daily living activities, among elderly people with osteoarthritis thereby it promotes the well-being and quality of life among elderly people with osteoarthritis.

**Key words:** Knee joint pain, Muscle strengthening exercises, elderly people, Improve physical function, Daily living activities.

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## INTRODUCTION

Ageing is a normal process of time related to change, begins with birth and continues through the life. The elderly have been defined as the chronological age 60-74 years older. People from 60 to 74 years old are usually considered early elderly, while those over 75 years old are referred to as late elderly. In old age physical strength deteriorates, mental stability diminishes. Ageing affects both the body and the mind. Although aging is inevitable. Age is the strongest predictor of the disease and therefore increasing age and extended life expectancy will result in a greater occurrence of the disease.

Pain in or around the knee that may indicate a condition affecting the knee joint itself or the soft tissue around the knee. Many factors contribute to knee joint pain, such as excessive physical activity, sprains, strains, sitting in one place for a long time or a similar position for a prolonged period. Knee joint pain

is an early sign of later incident of radiographic knee osteoarthritis (OA) However, the prevalence of knee joint pain in the general population is unknown. Old age can also cause knee joint pain due to wear and tear of the knee joint. Knee joint pain also begin as a mild discomfort, then slowly get worse.

Osteoarthritis (OA) is the most common type of arthritis. Its high prevalence especially in the elderly and the high rate of disability related to disease make it a leading cause of disability in the elderly. Osteoarthritis is a chronic degenerative disorder of multifactorial etiology characterized by the loss of articular cartilage, hypertrophy of bone at the margins, sub- chondral sclerosis, and range of biochemical and morphological alterations of the synovial membrane and joint capsule. Osteoarthritis is a complex disease entity that is difficult to diagnose and define" Incidence of knee Osteoarthritis (OA) is rising by increasing average age of general population. Old age, female gender, overweight and obesity, knee injury, repetitive use of joints, bone density, muscle weakness, and joint laxity all play roles in the developments of knee joint osteoarthritis pain and other symptoms of osteoarthritis (OA) may have a profound effect on quality of life affecting both physical function and psychological parameters. It is a leading cause of musculoskeletal disability in elderly people all over the world and a major cause of physical limitations and reduced quality of life. In the United States (US), and according to the World Health Organization (WHO), it is estimated that 10% of the world population over 60 years of age has symptomatic knee osteoarthritis, 4.5 and that 12% of adults aged 65 years and older have symptomatic knee osteoarthritis (OA).

The prevalence of knee osteoarthritis increases with age and is more common in women than in men. The World Health Organization, the International League Against Rheumatism, and global osteoarthritis experts have made substantial efforts over the past few decades, many population- based epidemiological studies of knee osteoarthritis have been conducted worldwide. Muscle strength has been defined as the ability to exert maximum force against resistance. It established the beneficial effects of exercise in patients with mild to moderate osteoarthritis of the knee, including muscle Strengthening and aerobic exercises which have been reported to be effective in reducing pain and improving physical function Although muscle strengthening exercise has been shown to improve pain and physical function and increase the daily living activities in patients with osteoarthritis of the knee. Regular engagement in muscle strengthening activities increases or preserves skeletal muscle strength, which has been shown to be inversely associated with mortality.

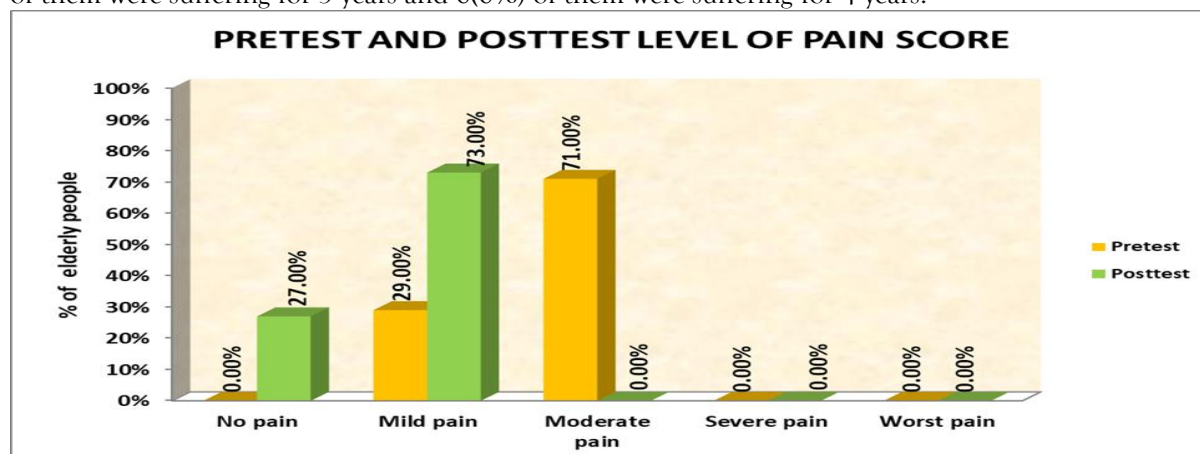
Need for the study: Osteoarthritis (OA) is a common, chronic condition that affects older adults. Age is the greatest risk factor for Osteoarthritis. Prevalence of Osteoarthritis is about 70% in the people between the ages of 55 and 74 years. By 40 years of age, 90% of the populations have degenerative joint changes in their weight bearing joints, even though clinical symptoms are usually absent. This is one of the reasons why osteoarthritis has been adopted as a major focus. Among the non- pharmacological management, exercise is the one of the cost effective and easy method to use for all the type of people to prevent knee joint pain and joint stiffness. Therefore, exercises are a part of a comprehensive arthritis treatment plan, which can help in improving the joint mobility, muscle strength and over all physical condition and healthy wellbeing. These exercises may include walking, swimming, yoga, and stretching exercises, muscle strengthening exercise, isometric exercises etc.

## METHODOLOGY

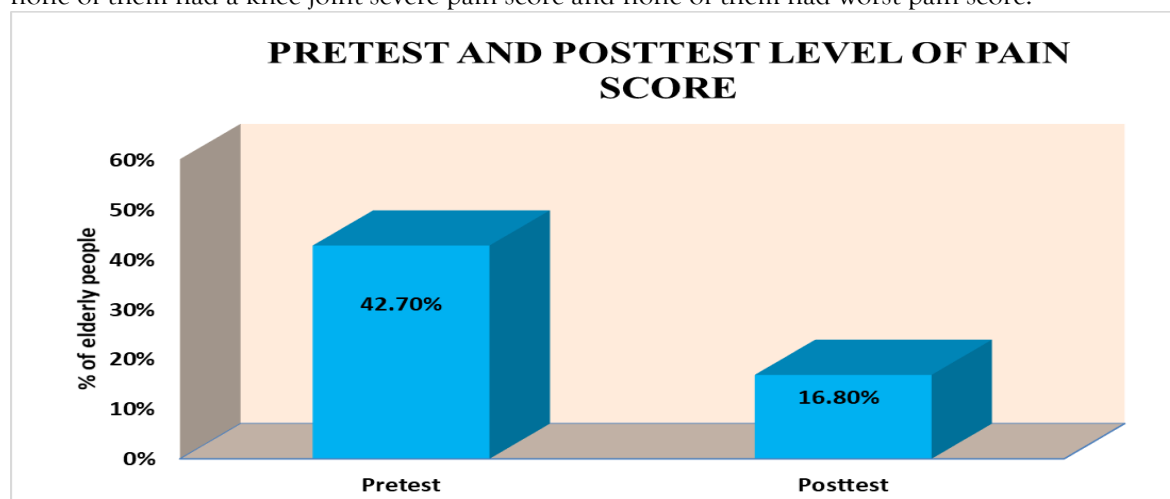
Quantitative experimental research approach with one group pre-test and post-test experimental design to assess the effectiveness of muscle strengthening exercise by using structured questionnaires among the elderly people. A total sample is 100 were selected using purposive sampling technique. The criteria for sampling technique are elderly people between 60 to 74 years, who were willing to participate in the study. The data collection period was done in the Tagore Medical College and Hospital, Chennai. The data were analysed and interpreted to evaluate the effectiveness of muscle strengthening exercises on knee joint pain and physical function among elderly people. The samples were selected by using the purposive sampling technique. In the pre-test, the Investigator assessed the severity of knee joint pain by using the Numerical pain Rating scale, WOMAC Index scale. The intervention of Muscle Strengthening Exercise was started. The duration of the exercise was 10 minutes twice a day for 30days. In the post-test, the investigator assessed the severity of knee joint pain on the 30 days of intervention of elderly women by

using the Numerical Pain Rating scale, WOMAC Index, to find out the effectiveness of Muscle Strengthening Exercise in reducing knee joint pain. Statistical analysis: A frequency table was formulated for all the significant information. Descriptive and inferential statistical methods were used for data analysis. Descriptive statistics applied for demographic variable analysis. In inferential statistics, Peridotites used to find the significance of intervention. Karl Pearson 's coefficient of correlation was used to determine the degree of relationship between selected demographic variables and knee joint pain levels among elderly women.

**RESULTS AND DISCUSSION:** Among the respondents, regarding age, majority of elderly people 17 (17%) were in the age group of 60-64 years, 21(21%) were in the age group of 65-68 years, 31(31%) were in the age group of 69-72 years and 31(31%) were in the age group of 73-74 years. With regard to sex, 20(20%) were male and 80(80%) were female. Regarding to Religion, 80(80%) were Hindu, 5(5%) were Muslim and 15(15%) were Christian. Regarding Marital status, 2(2%) were single, 85(85%) were married, 10(10%) were widow and 3(3%) were divorce Regarding educational status, majority 65(65%) had no formal education, 20(20%) had primary education, 10(10%) had high school education and 5(5%) had higher secondary education. Regarding number of children, 2(2%) had No children, 13(13%) had one child, 25(25%) had two children, 60(60%) had more than 2 children. Regarding duration of illness, majority 44(44%) of them were suffering for 2 years, 29(29%) of them were suffering for 1 year, 21(21%) of them were suffering for 3 years and 6(6%) of them were suffering for 4 years.



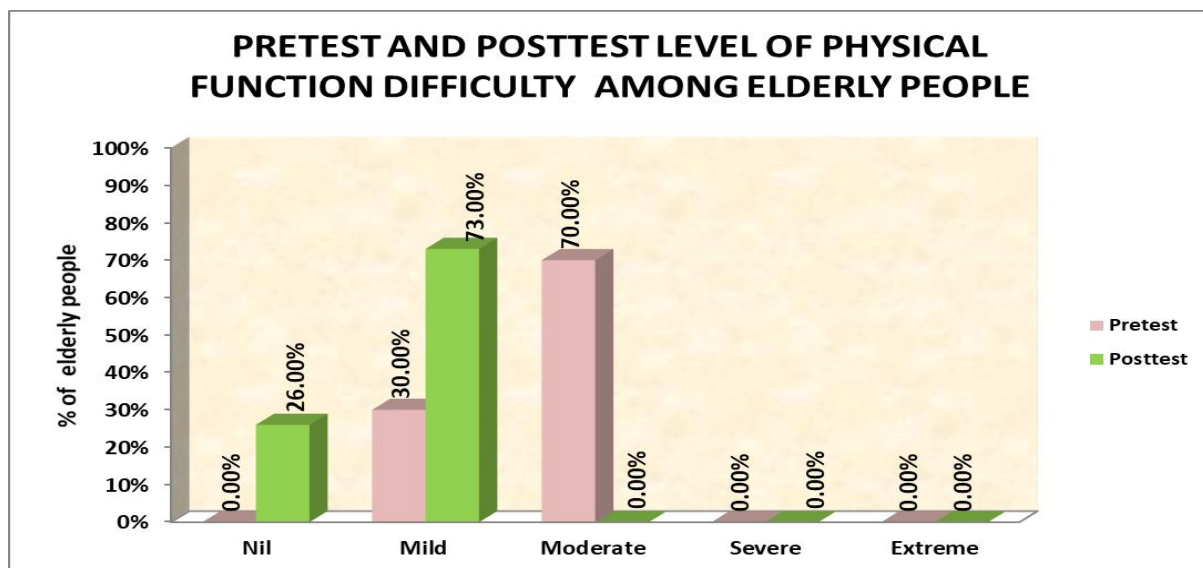
In pre-test, none of them are having No pain score, 29%of them having mild knee joint pain score, 71% of them having moderate knee joint pain score, none of them having knee joint severe pain score and none of them are having worst pain score. The post-test level of pain score 27% of them had a No pain score, 73% of them had a mild knee joint pain score, none of them had a moderate knee joint pain score, none of them had a knee joint severe pain score and none of them had worst pain score.



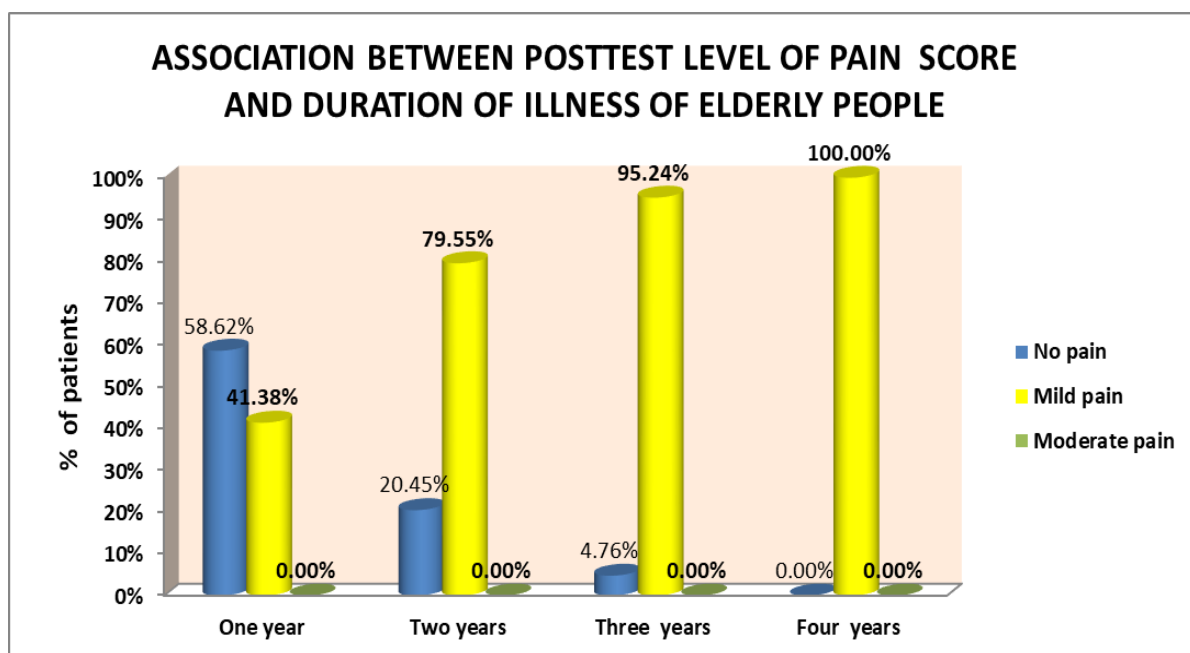
## COMPARISON OF PRE-TEST AND POST-TEST PAIN SCORE

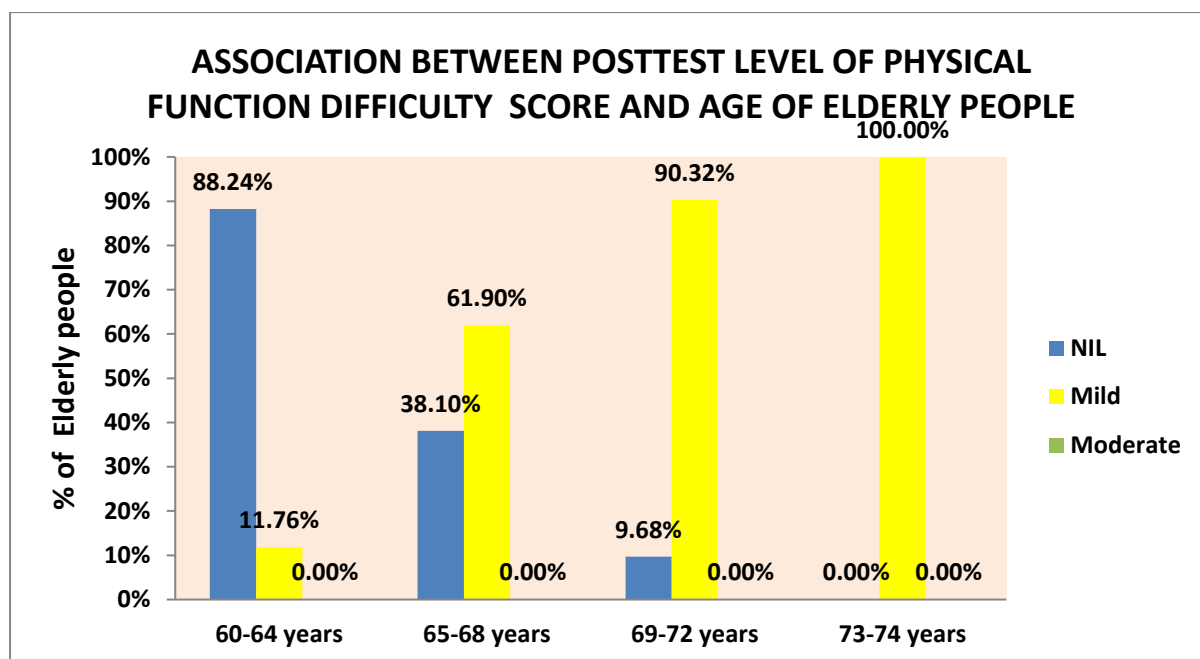
|      | n   | Pre-test<br>Mean $\pm$ SD | Post-test<br>Mean $\pm$ SD | Mean<br>Difference<br>Mean | Student's<br>paired t-test       |
|------|-----|---------------------------|----------------------------|----------------------------|----------------------------------|
| Pain | 100 | 4.27 $\pm$ 1.60           | 1.68 $\pm$ 1.17            | 11.43                      | t=40.65 p=0.001***<br>DF =99 (S) |

There is a significant a difference between pre-test and post-test knee joint pain score



In pre-test, none of them are having physical function difficulty score, 30% of them having mild physical function score, 70% of them having moderate physical function difficulty score. The post-test level of physical function score 74% of them had mild physical function difficulty scores, 26% of them had no pain.





the association between post-test level of physical function difficulty score and elderly people demographic variables. 60-64 years old elders and one year duration of illness elderly people is having more no pain than others. It was confirmed using chi square test.

The focus of the study was to assess the effectiveness of muscle-strengthening exercises on knee joint pain and physical function among elderly people with knee joint pain in selected hospitals at Chennai. The design used for this study was pre-test and post-test in design. The conceptual framework was based on modified Roy's adaption model 100 subjects were selected by purposive sampling technique and were assessed for the level of knee joint pain and physical function before and after muscle strengthening exercises.

The data was collected to assess the level of knee joint pain and physical function by using a numerical pain rating scale and a WOMAC Index scale. Day 1 and Day 2 pre-tests were done. After collecting the demographic variables, the numerical pain rating scale was used to assess knee joint pain, and the WOMAC Index scale was used to assess the physical function among elderly people with knee joint pain. The researchers demonstrated and assisted in doing the muscle-strengthening exercises. It was continued daily twice for 30 days. Post-test was conducted for 2 days. Levels of knee joint pain and physical function were assessed by using the same scale. The data were analysed by using descriptive and inferential statistics. In the pre-test, none of them had no pain score, 29% of them had a mild knee joint pain score, 71% of them had a moderate knee joint pain score, none of them had a knee joint severe pain score and none of them had to have worst pain score whereas in the post-test 27% of them are having No pain score, 74% of them having mild knee joint pain score, none of them having moderate knee joint pain score, none of them having knee joint severe pain score and none of them are having worst pain score.

In the pre-test, none of them had a physical dysfunction score, 29% of them had a mild physical function score, 71 % of them had a moderate physical function score whereas in the post-test, 26% of them had no pain and 74 % of them having a mild physical function. The mean pre-test score and the post-test score of knee joint pain among elderly people with knee joint pain were 4.27 (SD +1.60) and 1.68 (SD+ 1.17) respectively. The 't' value was 40.65 which was significant at  $p < 0.001$

The mean pre-test score and a post-test score of physical function among elderly people with knee joint pain were 30.10(SD+ 10.09) and 11.28(SD+ 9.07) respectively. The 't' value was 78.95 which was significant at  $p < 0.001$ . There is a significant association between post-test levels of joint pain among elderly people with knee joint pain with their selected demographic variables Significant associations were found between post-test level of physical function and duration of illness among elderly people with knee joint pain.

Interpretation: There is a significant positive moderate correlation between pain reduction gain score and physical function difficulty score. It means pain reduction increases their physical function difficulty also decreases moderately

The study findings revealed that the post-test knee joint pain score was significantly reduced after practicing muscle-strengthening exercises. Findings showed that practicing muscle strengthening exercises such as isometric, isotonic, and isokinetic exercises played an important role in reducing knee joint pain and improving physical function among elderly people.

## CONCLUSION

The present study was done to evaluate the effectiveness of muscle-strengthening exercises on knee joint pain and physical function among elderly people with knee joint pain. The result showed that, the mean post-test scores of knees joint pain was 1.68 (SD + 1.17) which was significantly lower than the mean pretest scores 4.27(SD + 1.60). so, the reduction of pain score is 25.90%. It shows the effectiveness of the study.

The mean post-test score of physical function was 11.28(SD + 9.07) which was significantly lower than the mean pretest score of 30.10 (SD+ 10.09). So, the reduction of pain score is 19.60%. It shows the effectiveness of the study. The value of knee joint pain score was 40.65 and physical function score was 78.95 which were significant at < 0.001 level. Therefore, practicing muscle strengthening exercises reduces knee joint pain and improves physical function among elderly people with knee joint pain which is non-expensive.

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