

*Original Article***Association between exercise and patient's recovery time after orthopedics surgery***Hassan Farahmand*, Mehri Doosti Irani**, Mahmoud Nasiri***, Ahmad Ghadami*******Abstract**

Background: Exercise preserve mental and physical health, and can play a rehabilitation role in chronic diseases. Since recovering after anesthesia and surgery can decrease patients' anxiety and allow patients to play their different role in society and their own life, this study aimed to determine the association between exercise and patient's recovery time after orthopedic surgery in recovery units.

Methods: The study was a retrospective descriptive- correlational study on 160 patients who were undergone orthopedic surgery in selected hospitals of Isfahan University of Medical Science at 2005. Data gathering was done using a questionnaire and the standard checklist for post anesthesia intensive care (base on Aldert scale). Data analysis was done in SPSS software using student t test and chi-square test.

Results: Results showed that case group (patients who reported doing exercise) had a mean recovery time of 25.57 minute (SD = 13.45), the control group who did not report doing exercise had a mean recovery time of 35.04 minute (SD = 17.11). There was a significant statistical relationship between doing exercise and recovery time ($p < 0.05$).

Conclusion: Recovery time in patients reported doing exercise was less than patients who did not. Therefore we can conclude that doing exercise is effective in recovery process.

Key words: Exercise, orthopedic surgery, recovery time, post anesthesia

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Exercise preserves mental and physical health. It can decrease the risk of chronic disease development and also can increase life - expectancy and quality of life during further years. Not only regular exercise is useful for many body systems especially cardiovascular system, musculoskeletal and respiratory system, also it results in peace of mind, decreasing stress and arising good temper.¹

Primary information base on world health organization researches about risk factors indicate that lack of physical activity or sedentary life is one of the major reasons for mortality all over the world.² Improving physical activity and exercise for all people is a measure which is supported by international Olympic committee.

This committee also state that exercise is human right.² Base on venous disease center's report, walking is the best exercise for patients who are affected with arterial disease or intermittent claudication.³

Regular exercise can eliminate some harmful hormones which are secreted due to psychological stress, decrease anxiety and depression, and improve body resistance in psychological and physical stress.⁴ Comparing 2 groups undergone total knee replacement surgery showed that 65% of patients, who had physical activity and exercise before surgery, reach to earlier efficacy than others.⁵ Litezman et al concluded that prevalence of bile stones were less in women had recreational-exercise activities.⁶ Another

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study found that 72% of people who walked as an exercise were affected by duodenal ulcer less than others, and also persons who do not exercise get gastrointestinal ulcer 50 times more than people who exercise.⁷ Exercise can reinforce immune system in cancer patients. Results of a study on 25 patients underwent surgery for resection of gastric tumor indicated that function of immune system among patients who begin exercise 2 days after surgery was better than others, and also the number of anti-cancer cells in this group were significantly more than others.⁷ Recovery unit has close and precise patient monitoring after surgery, and during awareness period (returning from anesthesia). It can reduce surgery complication because of special care which is delivered in this setting. Early treatment of complications can reduce significantly mortality and morbidity. So reduction of recovery time will be effective in preventing mentioned complications, helpful for decreasing patient anxiety and finally allow the patient to do him or his different role in society and her or his own life. Base on researcher experiences during 20 years in operation room it seems that patients who exercise have shorter recovery time, but it isn't obvious in literatures. This study has designed to assess the association between exercise and patients recovery time after orthopedic surgeries.

Methods

This study was a retrospective descriptive - correlational study on 160 patients who were undergone orthopedic surgery in selected hospitals of Isfahan University of medical science (2005). Patients who had undergone orthopedic surgeries were selected.

Exclusion criteria were as following; history of hypertension, respiratory, muscular, cardiovascular disease, receiving drugs (such as vasoconstrictive drugs, ketamin or other drug) except common anesthetic drugs.

Data gathering was done with a self-made questionnaire composed of demographic information, primary diagnosis, type of surgery,

type and duration of exercise, age at the starting point of exercise, type of current exercise and the standard checklist for post anesthesia intensive care (base on Aldert scale).⁸ Face Validity and pilot test were used for validity and reliability of first part of questionnaire, respectively.

The questionnaires were filled in pre-medication room and the standard checklist for post anesthesia intensive care was filled base on its guideline at the admission time in recovery unit. Standard checklist for post anesthesia intensive care was filled every 15 minute until patients got a necessary score (7 to 10) for discharge.

Finally for data analysis patients were categories in 3 groups based on exercise history; patients who reported acceptable exercise history (as case group), patients without exercise history (as control group) and patients who reported exercise history but it was not acceptable.

Data analysis was done in SPSS software using student t test, ANOVA and chi-square test.

Results

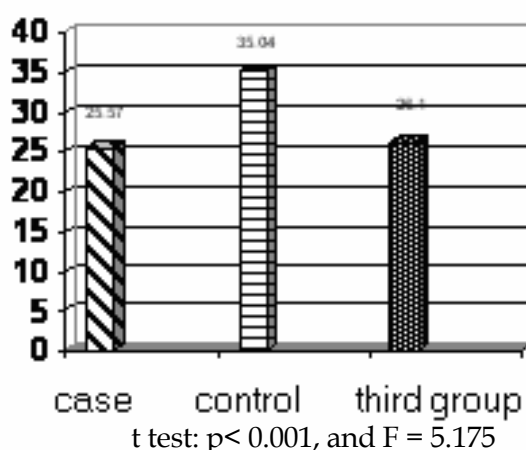
160 patients were enrolled in our study. Findings showed that one hundred thirty two patients (82.15%) were male with mean age of 31.7 (± 17.5) years and twenty eight patients (17.5%) were female with mean age of 32.8 (± 17.97) years.

Analysis of variance (ANOVA) did not show any significant difference between mean of ages in three groups ($p > 0.05$). Other demographic information is shown in table 1.

Results showed that case group (patients who reported doing exercise) had a mean recovery time of 25.57 minute (± 13.45), the control group who did not report doing exercise had a mean recovery time of 35.04 minute (± 17.11), and the third group (who reported exercise history but it was not acceptable) had a mean recovery time of 26.1 minute (± 12.31) (Figure 1).

Table 1: Demographic information of subjects

Standard deviation	mean	mode	maximum	minimum	Statistics index	Demographic information
14.46	30.22	20	74	4.5		Age (years)
12.73	169.88	170	192	85		Height (cm)
13.05	66.70	75	105	17		Weight (kg)
39.24	68.81	90 , 60	180	15		Duration of daily exercise (minute)
85.99	151.53	180	480	30		Duration of weekly exercise (minute)
9.85	15.52	40	54	11		Age at the beginning of exercise
148.64	125.17	120	1200	12		Period of exercise (months)
16.57	31.96	30	75	10		Recovery time (minute)
				42	private	
				14	Employee in an	job
				2.5	organization	
				11.3	High school	Education level (%)
				1.3	Under diploma	
				24.4	football	Type of exercise (%)
					running	

**Figure 1:** Mean of recovery time in subjects

Comparing the mean recovery time after surgery in case and control groups, there was significant statistical relationship between recovery time in two groups ($p < 0.001$). Analysis of variance (ANOVA) and Danken test showed that there was no significant statistical difference between case group and the third group, but there was a significant difference between control group and the third group ($p < 0.001$).

Also Analysis of variance (ANOVA) in comparing the mean recovery time after surgery based on type of exercise in case and control groups showed that there was no significant re-

lationship between recovery time and type of exercise in two groups ($p > 0.05$). It means that type of exercise is not related to recovery time.

Spearman correlation coefficient indicated that there was a significant negative correlation between recovery time and patient education in two groups ($p < 0.05$, $r_1 = -0.27$, $r_2 = -0.217$), so patients with higher educational level had shorter recovery time.

Also Analysis of variance (ANOVA) and chi-square test did not state any significant difference between recovery time and patient's age, height, weight, job and vital sings.

Spearman correlation coefficient indicated that there was no significant correlation between recovery time and duration of exercise, so that there was no shorter recovery time with increasing duration of exercise.

Discussion

In current study data analysis showed that the control group who did not report doing exercise had a mean recovery time of 35.04 (\pm 17.11) minutes; it is more than recovery time in patients who reported doing exercise. Until now many studies had done about the effect of exercise on function of different system in human body. All of them in direct and indirect way confirmed our suggestion and findings.^{9,10} Aziz Abadi (1997) in a study on patients who need surgery stated that physical ability to act in a suitable level in daily living, and or be familiar with sport medicine is really important not only for performing special skills, but even for general health, disease prevention and treatment of many disease.⁹

Neil Bradburg et al (1996) in their study on the 160 patients who had total knee replacement found that patients who exercised before surgery had better efficacy.⁵ Miyoshi and et al (2000) in a study under the title of "The effect of exercise on recovery process after surgery" concluded that during 14 days after exercise the results of Pulmonary Function Test (MVV¹, FEV², FVC³) were better than before exercise.¹⁰ In another study about the effect of exercise on patients' rehabilitation and improving heart rate in coronary artery bypass graft showed that patients who had 36 session of exercise program 3 times a week had a significant improvement in heart rate and rehabilitation than control group.¹¹ So it seems that exercises have really well effect on different aspect of patient health. Hence health care system must pay attention to it in order to improve society health status in different level of disease prevention and health promotion.

¹ Maximum ventilation volume

² Forced expiratory volume

³ Forced vital capacity

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