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Physical Rehabilitation: Activation and Regulation of Cellular Machinery Hidden Power as a New Medical Hypothesis

Ahed J Alkhatib

Department of Legal Medicine, Toxicology and Forensic Medicine, Jordan University Of Science & Technology, Jordan

ABSTRACT

Introduction: Physical rehabilitation has several advantages including restoring functions of an organ to physiological limits as much possible as it can be restored.

Study objectives: The main objectives of the present study are to give evidence on the cellular impact of physical rehabilitation based on our project cellular rehabilitation, and to construct our new medical hypothesis how cellular rehabilitation interferes with cellular machinery hidden power.

Methods and materials: The method of this study depended on literature and our experiments to satisfy the study objectives and constructing our hypothesis.

Study findings: Based on existing literature and our experiments, we showed how physical rehabilitation has impacts on cellular level, epigenetic level, and biochemical level. Accordingly, we constructed our hypothesis: "**physical rehabilitation: activation and regulation of cellular machinery hidden power as a new medical hypothesis**".

Conclusions: The results of this study supported our proposed hypothesis.

***Corresponding author**

Ahed J Alkhatib, Department of Legal Medicine, Toxicology and Forensic Medicine, Jordan University Of Science & Technology, Jordan. E-mail: ajalkhatib@just.edu.jo

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Introduction

An overview of physical rehabilitation

Active recuperation or physiotherapy joins an assortment of variables focused on the avoidance and treatment of illnesses by methods for characteristic components (sun, ocean, recuperating mud, water, development) also, preformed factors (electric flow, ultrasound, counterfeit light including laser beams, attractive field, and so on.). Their activity diminishes torment, invigorates rebuilding forms, increments scope of movement, enacts insusceptible components, and improves biochemical execution. Contrasted with different treatments, the exercise based recuperation is less expensive, non-obtrusive, and simple to apply [1].

Physical treatment is frequently utilized as a clinical strategy to improve any individual who might be harmed so they may come back to performing regular errands, or for a competitor, sport. The procedure of physical treatment can be requesting and regularly difficult truly and mentally [2, 3].

Conducted a study to show the aftereffects of previous works for around 10 years with respect to practice wellbeing impacts [4]. Physical rehabilitation has been found to have huge impacts under physiological conditions and pathologic conditions, for example, diabetes, Parkinson's malady, osteoporosis, and others. Nuclear impacts of physical exercise were appeared through up-guideline of certain arbiters in certain pathways that incorporate HSP70, VEGF, P16; and downregulation of certain middle people in different pathways that incorporate iNOS, P53, and estrogen receptor. These cell varieties act to improve wellbeing. Studies in osteoporosis uncovered that physical exercise improves the wellbeing of bone through expanding levels of calcium and bone mineral thickness. Taken together, physical rehabilitation improves the strength of different body frameworks and organs and aides in assurance and remedial conditions.

Study hypothesis

The study hypothesis states that "**physical rehabilitation: activation and regulation of cellular machinery hidden power as a new medical hypothesis**" In the following section, we will show the theoretical bases of this hypothesis based on our previous studies.

Physical exercise has noteworthy wellbeing impacts more than it is thought. In this study, this subject will be explored top to bottom taking into account our examinations and others. In the primary gathering of studies, a study of trial contemplates is demonstrating how physical practice improves the wellbeing under physiological and pathologic conditions [5]. directed an

investigation to investigate the impact of physical exercise to control levels of estrogen receptor (ERα) and p16 in rodents with type 1 diabetes, and endometrial hyperplasia related with diabetes. The technique involved the induction of diabetes type 1. Four gatherings were arbitrarily chosen (N=10) and allocated as: sedentary control (SC), exercise control (EC), sedentary diabetic (SD), and exercise diabetic (ED). Treadmill program was applied for about a month. Regular histological assessment (hematoxylin and eosin) was performed to look at histological status and hyperplasia; and immunohistochemistry was applied to examine the expression of ERα and p16. The results demonstrated that hyperplasia was observed in rodents in SD gathering (70%). No hyperplasia was observed either in rodents in SC gathering or ED gathering. On molecular level, diabetic type 1 rodents over-expressed the levels of ERα and down-expression the expression of p16 significantly ($p<0.05$) in SD group rodents as compared with rodents in SC group. Exercise had positive effects in turning around the antagonistic impacts of diabetes ED group rodents. As an end, extreme effects of diabetes on endometrial tissue can be hindered by physical activity.

Considering the developing assemblage of the literature indicating the gainful impacts of physical rehabilitation on patients with Parkinson's Disease (PD), we led an investigation to investigate the expression of inducible nitric oxide synthase (iNOS) and neuronal nitric oxide (nNOS) in the cerebrum of a chronic mouse model of PD. The second target of this examination was to examine the impact of endurance exercise on the expression of these markers. Approach included enlistment of mouse PD model utilizing 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) and probenecid. Forty albino mice were allocated arbitrarily into 4 groups (N=10), sedentary control (SC), exercise control (EC), sedentary PD (SPD), and exercise PD (EPD).

Training program utilizing treadmill was applied for about a month. At the end of the trial, the expression of biomarkers was evaluated in the striatum in all groups utilizing immunohistochemical procedures. Study results showed that nNOS was significantly over-expressed in striatum of SPD mice as compared with SC mice. Physical exercise was insignificantly able to down regulate the expression of nNOS in EC as compared with SC group. On the other hand, physical rehabilitation was significantly able to down-regulate the expression of nNOS in EPD compared with that of SPD. The expression of iNOS nearly followed similar patterns of intuitiveness, except that the expression of iNOS in EC and EPD groups was not significant. By conclusion, a month of physical activity significantly impacts the expression of nNOS and iNOS in the striatum of mouse PD [6].

In another examination on PD, we contemplate a few viewpoints, for example, muscle weakness and fatigue related with this disease especially among elder patients. The goals of the examination were to research the expression of iNOS in the skeletal muscles of mice with PD and to investigate the impacts of physical exercise on the expression of iNOS in these muscles. PD was actuated as shown previously. The outcomes of the study demonstrated that PD significantly upregulated the expression of iNOS in gastrocnemius muscle in SPD group in comparison with that in the SC group. Then again, in soleus muscle, there was no critical up-regulation of iNOS in the SPD group as compared with the SC group. Taken together, physical rehabilitation lessened the progressions in iNOS expression related with PD in skeletal muscles. We believe that these discoveries may have huge ramifications in rehabilitation programs for PD [7].

In another investigation on PD, we investigated the impact of physical rehabilitation on the expression of HSP70 in brains of mice with initiated Parkinson's Disease. The techniques were as depicted previously, the outcomes indicated that the expression of HSP70 was significantly down-regulated because of PD compared with the control group. Exercise was able to up-regulate the expression of HSP70 in the EC group compared with that in the control group. No significant up-regulation in the EPD group compared with that in the PD group was observed. Taken together, we think that physical rehabilitation has a critical role in improving the wellbeing status of mice with Parkinson malady [8].

In another examination, we explored the effect of physical exercise on the renal vascular endothelial growth factor (VEGF) expression in type I diabetic rats. Diabetes was initiated by streptozotocin in the rats in the two diabetic groups. Results showed that diabetes significantly up-regulated the expression of VEGF in the SD group compared with that in the SC group. Physical rehabilitation fundamentally down-regulated the expression of VEGF in the renal tissue in the ED group compared with the SD group. Taken together, physical rehabilitation hindered the up-regulation of VEGF related with diabetes in renal tissue [9].

We directed another examination to investigate the expression of both P53 and iNOS in cardiovascular muscle of rats with type 1 diabetes. The strategy we followed as portrayed before. The investigation discoveries demonstrated that both iNOS and P53 were up-regulated in cardiovascular tissue of diabetic rats. Physical rehabilitation had the option to significantly downregulate the expression of P53, and unimportantly down-regulate the expression of iNOS. Taken together, physical rehabilitation can bring down the complexities of diabetes in heart tissue [10].

We directed another investigation to explore the impact of physical rehabilitation on the statement of VEGF in the cardiac tissue of diabetic rat. The methods were previously portrayed. The outcomes indicated that type 1 diabetes significantly down-regulated the expression of VEGF in the SD group as compared to the SC group. Physical rehabilitation significantly up-regulated the expression of VEGF in the cardiac tissue in the ED group compared with that in the SD group. Taken together, physical rehabilitation can improve the heart wellbeing through up-regulation of VEGF in cardiac tissue. Our current information proposes that physical rehabilitation improved diabetes-prompted VEGF expression [11].

At last, anaerobic exercise was appeared to improve the status of osteoporosis in human subjects. Evaluating previous studies indicated that physical rehabilitation is conceivably ready to defer or restrain osteoporosis. These studies contemplated the adjustments in bone mineral substance following physical exercise for a half year in 2 gatherings of postmenopausal ladies. One gathering followed vigorous exercise conventions, and the other gathering followed opposition work out. The two sorts of activity altogether improved degrees of BMD, serum calcium (Ca), and parathyroid hormone [12-16].

Conclusions

In the light of above studies, physical rehabilitation has benefits more than it is thought in the cellular, epigenetics, and biochemical levels. The hypothesis we try to establish states that:" **"physical rehabilitation: activation and regulation of cellular machinery hidden power as a new medical hypothesis"**. The hidden power of the cell is a great domain for future studies and it can be mimicked and employed in the treatment of diseases. We think that our hypothesis is right and can be more investigated by other researchers.

References

1. Zaralieva A, Georgiev G P, Karabinov V, Alexandar Iliev, Assen Aleksiev, et al. (2020). Physical Therapy and Rehabilitation Approaches in Patients with Carpal Tunnel Syndrome. Cureus 12: e7171.
2. Podlog L, Eklund R C (2004) Assisting injured athletes with the return to sport transition. Clinical Journal of Sport Medicine.14: 257-259.
3. Zielinski, Juliette (2018) The Impact of Physical Therapy on an Athletes Decision to Return to Sport. In BSU Honors Program Theses and Projects. 259. Available at: http://vc.bridgew.edu/honors_proj/259.
4. Ahed J Alkhatib (2019) Molecular and Biochemical Outcomes of Exercise: A Review Study. Glob J Ortho Res. 1: GJOR. MS.ID.000524. DOI: 10.33552/GJOR.2019.01.000524.
5. Muhammed Al-Jarrah, Ismail Matalka, Hasan Al Aseri, Alia Mohtaseb, Irina V Smirnova, et al. (2010). Exercise Training Prevents Endometrial Hyperplasia and Biomarkers for Endometrial Cancer in Rat Model of Type 1 Diabetes. J Clin Med Res 2: 207-214.
6. Al-Jarrah M, Obaidat H, Bataineh Z, Walton L, Al-Khateeb A (2013). Endurance exercise training protects against the upregulation of nitric oxide in the striatum of MPTP/probenecid mouse model of Parkinson's disease. Neurorehabilitation 32:141-147.
7. Nour Erikat, Ahed Alkhatib, Al-Jarrah M (2013). Endurance exercise training attenuates the up regulation of iNOS in the skeletal muscles of chronic/progressive mouse model of Parkinson's disease. J Neurol Res 3: 108-113.
8. Fatima Laiche, Noureddin Djeblia, Ahed Alkhatib, Murtala Muhammad (2014). Exercise training upregulates the expression of hsp70 in brain of mice with induced Parkinson Disease. Journal of Animal and Veterinary Advances 13: 302-305.
9. Muhammed Al-Jarraha, Nour Erekatb, Ahed Al Khatib (2014). Upregulation of Vascular Endothelial Growth Factor Expression in the Kidney Could Be Reversed Following Treadmill Exercise Training in Type I Diabetic Rats. World J Nephrol Urol 3:25-29.
10. Muhammed Al-Jarrah, Mohammed Bani Ahmad, Mikhled Maayah, Ahed Al-Khatib (2012). Effect of Exercise Training on the Expression of p53 and iNOS in the Cardiac Muscle of Type I Diabetic Rats. Journal of Endocrinology and Metabolism 2: 176-180.
11. Muhammed Al-Jarraha, Nour Erekatb, Ahed Al Khatib (2014). Upregulation of Vascular Endothelial Growth Factor Expression in the Kidney Could Be Reversed Following Treadmill Exercise Training in Type I Diabetic Rats. World J Nephrol Urol 3:25-29.
12. Karlsson MK, Nordqvist A, Karlsson C (2008). Physical activity increases bone mass during growth. Food Nutr Res 52.
13. Rizzoli R, Bianchi ML, Garabedian M, McKay HA, Moreno LA (2010). Maximizing bone mineral mass gain during growth for the prevention of fractures in the adolescents and the elderly. Bone 46: 294-305.
14. Aldahr MHS (2012) Bone mineral status response to aerobic versus resistance exercise training in postmenopausal women. World Appl Sci J 16: 806-813.
15. Gunter KB, Almstedt HC, Janz KF (2012) Physical activity in childhood may be the key to optimizing lifespan skeletal health. Exerc Sport Sci Rev 40:13-21.
16. Mc Millan LB, Zengin A, Ebeling PR, Scott D (2017). Prescribing physical activity for the prevention and treatment of osteoporosis in older adults. Healthcare 5: 85.