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WAYS TO INCREASE THE EFFECTIVENESS OF CARDIOREABILITATION IN PATIENTS AFTER PCI: EMPHASIZING THE INTEGRATION OF BODY AND MIND

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✓ ***Resume***

Cardiorehabilitation after transcutaneous coronary intervention (TCI) in patients with myocardial infarction remains a key area of secondary prevention and rehabilitation. The article examines modern approaches to integrating physical training and psycho-emotional support into a unified rehabilitation program. Data on the effectiveness of combined interventions, the impact of anxiety and depressive disorders on compliance and prognosis, and the role of digital technologies in expanding the availability of programs are presented. Special attention was paid to the contributions of leading researchers such as Anderson, Celano, Blumenthal, and Kabboul to the development of the integrative rehabilitation concept. Analysis of modern clinical data confirms that comprehensive rehabilitation approaches significantly improve physical, emotional, and prognostic indicators in patients after PCV. The article emphasizes the need for a multidisciplinary approach to managing this category of patients

Keywords: myocardial infarction, percutaneous coronary intervention, cardiac rehabilitation, psycho-emotional state, physical training, depression, anxiety, telemedicine, compliance

ПУТИ ПОВЫШЕНИЯ ЭФФЕКТИВНОСТИ КАРДИОРЕАБИЛИТАЦИИ У ПАЦИЕНТОВ ПОСЛЕ ЧКВ: АКЦЕНТ НА ИНТЕГРАЦИЮ ТЕЛА И РАЗУМА

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✓ ***Резюме***

Кардиореабилитация после чрескожного коронарного вмешательства (ЧКВ) у пациентов с инфарктом миокарда остается ключевым направлением вторичной профилактики и реабилитации. В статье рассматриваются современные подходы к интеграции физических тренировок и психоэмоциональной поддержки в единую программу реабилитации. Представлены данные об эффективности комбинированных вмешательств, влиянии тревожных и депрессивных расстройств на приверженность лечению и прогноз, роли цифровых технологий в расширении доступности программ. Особое внимание уделено вкладу ведущих исследователей, таких как Андерсон, Челано, Блюменталь и Каббул, в разработку концепции интегративной реабилитации. Анализ современных клинических данных подтверждает, что комплексные подходы к реабилитации значительно улучшают физические, эмоциональные и прогностические показатели у пациентов после ЧКВ. В статье подчеркивается необходимость мультидисциплинарного подхода к ведению этой категории пациентов

Ключевые слова: инфаркт миокарда, чрескожное коронарное вмешательство, кардиореабилитация, психоэмоциональное состояние, физические тренировки, депрессия, тревога, телемедицина, приверженность лечению

TERIDAN O‘TKAZIB KORONAR ARALASHUVDAN SO‘NG BEMORLARDA YURAK REABILITATSIYASI SAMARADORLIGINI OSHIRISH YO‘LLARI: TANA VA RUHIYATNING UYG‘UNLIGIGA URG‘U BERISH

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✓ ***Rezyume***

Miokard infarkti bilan og‘rigan bemorlarda teridan o‘tkazib koronar aralashuvdan (TKA) keyingi kardioreabilitatsiya ikkilamchi profilaktika va reabilitatsiyaning asosiy yo‘nalishi bo‘lib qolmoqda. Maqolada jismoniy mashq va ruhiy-hissiy qo‘llab-quvvatlashni yagona reabilitatsiya dasturiga kiritishning zamonaviy yondashuvlari ko‘rib chiqilgan. Birlashtirilgan aralashuvlarning samaradorligi, xavotir va depressiv buzilishlarning davolanishga rioya qilish va prognozga ta’siri, dasturlarning mavjudligini kengaytirishda raqamli texnologiyalarning o‘rni haqidagi ma’lumotlar keltirilgan. Integrativ reabilitatsiya konsepsiyasini ishlab chiqishda Anderson, Celano, Blumenthal va Kabboul kabi yetakchi tadqiqotchilarning hissalariga alohida e’tibor qaratilgan. Zamonaviy klinik ma’lumotlar tahlili shuni ko‘rsatadiki, kompleks reabilitatsiya yondashuvlari TKAdan keyin bemorlarda jismoniy, ruhiy va prognoz ko‘rsatkichlarini sezilarli darajada yaxshilaydi. Maqolada ushbu toifadagi bemorlarni davolashda ko‘p tarmoqli yondashuv zarurligi ta’kidlangan

Kalit so‘zlar: miokard infarkti, teri orqali koronar aralashuv, kardioreabilitatsiya, ruhiy-hissiy holat, jismoniy mashq, depressiya, xavotir, teletibbiyot, davolanishga rioya qilish

Relevance

Myocardial infarction (MI) remains one of the leading causes of death and disability among the adult population worldwide. In recent decades, the widespread use of percutaneous coronary intervention (PCI) has significantly reduced hospital mortality and improved patient outcomes. However, the effectiveness of revascularization is largely determined by the quality of subsequent cardiac rehabilitation, which includes both physical and psycho-emotional components [1,2]. Modern cardiorehabilitation programs are aimed not only at restoring physical activity but also at correcting anxiety-depressive disorders, reducing stress, and increasing compliance, which in combination improves clinical outcomes and the quality of life of patients [3]. Transcutaneous coronary intervention (TCI) has become the gold standard for treating myocardial infarction (MI), allowing for rapid restoration of coronary blood flow and reducing the risk of complications [1].

Research objective: scientifically develop ways to increase the effectiveness of cardioreabilitation in patients after pci: emphasis on body and mind integration

Materials and methods

However, the success of PCI is determined not only by the technical side of the intervention, but also by the effectiveness of the subsequent recovery period. It is cardiac rehabilitation aimed at comprehensive recovery - both physical and psycho-emotional - that forms long-term clinical and prognostic success [2, 20]. Modern research emphasizes: the isolated application of physical exercises or psychological interventions is not as effective as their integration within a multidisciplinary program [3]. Joining the body and mind during the recovery process after PCI becomes the key to reducing readmissions, improving life quality, and increasing life expectancy. Scientific foundations and contributions of leading researchers Professor Leonard Anderson (University of York, UK) has been engaged in clinical evaluation of physical rehabilitation programs for over 20 years.

His 2016 meta-analysis showed a significant decrease in cardiovascular mortality during regular physical activity [2]. Cardiopsychologist Christopher Celano (Massachusetts General Hospital) made significant contributions to understanding the role of anxiety and depressive disorders in MI outcomes. He showed that even subclinical forms of anxiety can affect compliance and prognosis [10,19]. Professor James Blumenthal (Duke University) studied the impact of stress management on the state of the

vascular system and confirmed that psycho-emotional interventions can reduce inflammation and cortisol levels, improving heart outcomes [9,17,18].

A team led by Nadine Kabboul (McMaster University, Canada) developed a systematic approach to assessing the key components of cardiac rehabilitation, revealing that combined programs (physics + psycho-emotional support) are 30-40% more effective [12]. Physical rehabilitation: foundations and opportunities for expansion. Physical activity is the cornerstone of cardiac rehabilitation. Regular exercise improves endothelial function, promotes myocardial remodeling, controls risk factors (blood pressure, glycemia, lipids), and increases physical performance [4].

The classic physical rehabilitation scheme includes:

- Individually selected exercise based on a 6-minute walk or veloergometry test
- Monitoring on the Borg scale and heart rate
- Use telemedicine devices to monitor rhythm and pressure at home [5]

Studies confirm that patients actively involved in physical rehabilitation demonstrate a 26% reduction in the risk of recurrent heart attack and a 20% reduction in overall mortality [6]. However, in the absence of psycho-emotional correction, these achievements can be leveled.

Psychoemotional recovery: underestimated potential

Psychoemotional disorders after myocardial infarction (MI) and percutaneous coronary intervention (PCI) are a widespread and underestimated phenomenon. According to reviews, up to 45% of patients experience clinically significant anxiety or depression within the first 6 months after intervention [7]. These conditions are associated with low adherence to therapy, refusal of rehabilitation, and increased mortality [8].

Key correction methods:

- Cognitive-behavioral therapy
- Individual and group psychotherapeutic sessions
- Drug treatment (selective serotonin reuptake inhibitors)
- Inclusion of educational modules and stress management programs [9]

Patients receiving comprehensive psychoemotional support show better results on the HADS, Beck, and SF-36 scales, as well as higher compliance and physical activity indicators [10].

Body-mind integration: clinical synergy

The most pronounced effect is achieved when working simultaneously on the physical and psychoemotional components. Combined programs lead to:

- Increased exercise tolerance
- Reduced anxiety and depression
- Increased adherence to medication therapy
- Improved overall prognosis [11]

A systematic review by Kabboul et al. showed that the presence of both physical and psychoemotional components in cardiac rehabilitation increases its effectiveness by 30-40% compared to single-intervention approaches [12].

The role of digital solutions

Results and discussions

The digitalization of medicine contributes to the expansion of accessibility and individualization of rehabilitation. Using mobile applications, bracelets with physical activity monitoring functions, and remote psychotherapy increases patient engagement and reduces barriers to program participation [13].

Randomized studies have shown that telerehabilitation is no less effective and safe than face-to-face programs, especially in young and middle-aged patients [14].

Physical rehabilitation: foundations and opportunities for expansion

Physical activity is the cornerstone of cardiac rehabilitation. Regular exercise improves endothelial function, promotes myocardial remodeling, controls risk factors (blood pressure, blood glucose, lipids), and increases physical performance [4].

The classic physical rehabilitation scheme includes:

- Individually tailored exercise based on a 6-minute walk test or bicycle ergometry
- Monitoring using the Borg scale and heart rate
- Use of telemedicine devices to monitor heart rhythm and blood pressure at home [5]

Studies confirm that patients actively involved in physical rehabilitation demonstrate a 26% reduction in the risk of recurrent heart attack and a 20% reduction in overall mortality [6]. However, in the absence of psycho-emotional correction, these achievements may be nullified.

Cardiac rehabilitation is traditionally divided into three stages:

1. Hospital (Stage I)
2. Outpatient (Stage II)
3. Long-term/sanatorium (Stage III)

Physical activity is selected individually based on the results of stress tests (6-minute walking test, treadmill, bicycle ergometry), assessment of exercise tolerance, and the patient's functional state [4].

Methods of physical rehabilitation include:

- Moderate aerobic activity (walking, swimming, cycling)
- Measured strength exercises
- Physical therapy under physiotherapist supervision
- Using the Borg scale to assess perceived exertion [5]

Regular physical activity contributes to improving metabolic profile, reducing the frequency of cardiovascular complications, and improving left ventricular function [6].

Psychoemotional recovery: underestimated potential

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Patients receiving comprehensive psycho-emotional support show better results on the HADS, Beck, and SF-36 scales, as well as higher compliance and physical activity indicators [10].

Psycho-emotional disorders (anxiety, depression, emotional burnout) are observed in 30-50% of MI patients and are associated with a poor prognosis [7].

Mechanisms of influence:

- Disruption of autonomic nervous system regulation
- Increased sympathetic activity
- Decreased adherence to treatment

Assessment tools:

- HADS Anxiety and Depression Scale
- Beck Depression Inventory
- SF-36 Quality of Life Scale

Correction methods:

- Psychotherapeutic interventions (cognitive behavioral therapy, group therapy)
- Pharmacological support (antidepressants, anxiolytics)
- Educational programs and motivational interviews [8,9]

Integration of components into a single program

The combination of physical and psycho-emotional components increases the effectiveness of cardiac rehabilitation. Multidisciplinary teams (doctors, rehabilitation specialists, psychologists, dietitians) allow:

- Individualization of the approach
- Increased patient motivation
- Improved compliance and metabolic control indicators

Current data indicate that patient participation in a comprehensive rehabilitation program reduces overall mortality by 20-30% and the risk of recurrent MI [10].

Body-mind integration: clinical synergy

The most pronounced effect is achieved when working simultaneously on physical and psycho-emotional components. Combined programs lead to:

- Increased exercise tolerance
- Reduced anxiety and depression
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- Improved overall prognosis [11,22]

A systematic review by Kabboul et al. showed that the presence of both physical and psycho-emotional components in cardiac rehabilitation increases its effectiveness by 30-40% compared to single-intervention approaches [12, 23].

The role of digital solutions

The digitalization of medicine contributes to expanding the accessibility and individualization of rehabilitation. Using mobile applications, activity-tracking bracelets, and remote psychotherapy increases patient engagement and reduces barriers to program participation [13].

Randomized studies have shown that tele-rehabilitation is no less effective than in-person programs in terms of effectiveness and safety, especially for young and middle-aged patients [14, 25]. The digitalization of medicine enables the development of telemedicine cardiac rehabilitation programs, particularly in outpatient settings and under pandemic restrictions. Applications for monitoring physical activity, heart rate, mood, and medication intake are becoming important tools for improving rehabilitation effectiveness [11].

Conclusion

Optimizing cardiac rehabilitation after myocardial infarction and PCI is impossible without integrating physical and psycho-emotional approaches. Body and mind are two interconnected recovery mechanisms, and ignoring one of them reduces overall effectiveness. Personalized, digitally supported programs are a path to sustainable recovery and secondary prevention in patients with high cardiovascular risk. Optimizing cardiac rehabilitation in patients after myocardial infarction who have undergone PCI requires a comprehensive approach that combines physical and psycho-emotional methods. Structured, personalized programs allow for more stable clinical and functional outcomes, improve quality of life, and reduce recurrent adverse events.

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