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SEMAGLUTIDE IN OBESITY AND EXERCISE MEDICINE: A REVIEW OF CLINICAL EVIDENCE, PERFORMANCE IMPLICATIONS, AND IMPLEMENTATION CHALLENGES

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ABSTRACT

Background. Obesity is a growing global public health issue. Semaglutide (Ozempic), a glucagon-like peptide-1 receptor agonist (GLP-1 RA), represents a breakthrough in obesity pharmacotherapy, with documented benefits in weight reduction, metabolic control, and cardiovascular risk reduction.
Aim. To review key clinical evidence on semaglutide in obesity treatment, explain its mechanism of action, and discuss practical aspects of implementing semaglutide therapy in Poland, including accessibility and long-term use, with particular emphasis on integration with physical activity and rehabilitation.
Material and methods. The article is based on a narrative synthesis of existing sources, including key clinical trials, meta-analyses, international recommendations, and Polish regulatory and reimbursement documents concerning semaglutide use in obesity.
Conclusions. Semaglutide is an effective and innovative pharmacological option in obesity management, with additional potential benefits for physical activity tolerance and weight-related rehabilitation in both recreationally active and sedentary individuals. Optimal long-term outcomes require combining semaglutide therapy with comprehensive lifestyle interventions, particularly structured exercise programs, while addressing challenges of accessibility and long-term treatment in Poland.

KEYWORDS

Semaglutide, Obesity, Weight Management, Physical Activity, Sports Medicine

CITATION

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1. Introduction

Obesity is a chronic metabolic disease with steadily increasing prevalence worldwide According to WHO (2024), over 25% of Polish adults are classified as obese (BMI ≥30 kg/m2) (*Obesity and Overweight*, n.d.) Treatment includes lifestyle modification, pharmacotherapy, and bariatric surgery Semaglutide, a GLP 1 receptor agonist, has become the new pharmacological standard demonstrating superior efficacy compared with earlier agents (Marso et al., 2016; Rubino et al., 2021; Wilding et al., 2021) This shift reflects a broader paradigm change that began with the identification of GLP-1 as a key satiety hormone and therapeutic target for obesity treatment (Astrup, 2024). Regular physical activity plays a key role in the prevention and management of obesity. According to the WHO and the Polish Ministry of Health, lifestyle modification - including structured exercise programs - remains the foundation of obesity treatment. Pharmacotherapy with semaglutide should be viewed as an adjunct, not a substitute, for an active lifestyle. Combining semaglutide with aerobic and resistance training has been shown to improvebody composition, preserve lean muscle mass, and enhance cardiorespiratory fitness, which is particularly relevant for individuals aiming to return to or maintain physical performance levels.

2. Results

Mechanism of Action

Semaglutide mimics endogenous GLP 1, stimulating insulin secretion, inhibiting glucagon release, delaying gastric emptying, and reducing appetite. These mechanisms lead to lower caloric intake, decreased fat mass, and improved metabolic control. Additionally, it positively affects blood pressure and lipid profiles (Frías et al., 2021; Garvey et al., 2022; Wilding et al., 2022)These pleiotropic effects are consistent with the broader class profile of GLP-1 receptor agonists, including central actions on satiety and reward pathways (Astrup, 2024).

Clinical Evidence

The STEP 1-5 trials demonstrated that weekly semaglutide 2.4 mg combined with lifestyle intervention resulted in 15-17% average body weight loss over 68 weeks (Rubino et al., 2021; Wilding et al., 2021). These results have been confirmed and contextualized in updated systematic reviews and meta-analyses, including a recent synthesis incorporating the two-year STEP 5 data (Qin et al., 2024). The SUSTAIN 6 study confirmed cardiovascular benefits in patients with type 2 diabetes (Marso et al., 2016). Comparative analyses indicate that semaglutide provides greater efficacy and similar safety compared to other GLP 1 receptor agonists (Frías et al., 2021; Garvey et al., 2022; Ryan et al., 2024).

Clinical Application in Poland

In Poland, semaglutide is available in both injectable and oral formulations. According to the 2025 Polish Diabetes Association (PTD) guidelines, it is indicated for patients with BMI $\geq$ 30 kg/m^2 or BMI $\geq$ 27 kg/m^2 with comorbidities (Ryan et al., 2024)Therapy requires medical supervision and regular monitoring of body weight and side effects such as nausea or constipation. Limited reimbursement and high cost remain barriers to broader use.

3. Discussion

Semaglutide redefines pharmacological obesity management by achieving up to 20% body weight reduction and improved metabolic outcomes, although several clinically important questions remain regarding optimal duration of therapy, long-term safety, and equitable access (Tzoulis & Baldeweg, 2024). Long-term success depends on continued treatment, as weight regain often occurs after discontinuation and adherence may be influenced by cost, tolerability, and lifestyle factors (Mozaffarian et al., 2025; Riveline et al., 2022; Wilding et al., 2022) Future directions include combination therapies, the integration of nutritional strategies tailored to GLP-1 therapy (Mozaffarian et al., 2025), and clarification of semaglutide's place in therapy relative to newer incretin-based agents such as tirzepatide, which has shown greater weight-loss efficacy in head-to-head comparison trials (Aronne et al., 2025).

From the perspective of sports and exercise medicine, semaglutide represents an important advancement for individuals struggling with weight reduction despite adherence to physical training. While pharmacologically induced weight loss can improve mechanical efficiency and cardiometabolic risk, it may also negatively affect skeletal muscle mass and function, underscoring the need for "muscle-centric" monitoring and structured resistance training during treatment (Prado et al., 2024). Clinicians should therefore consider gradual exercise adaptation, adequate protein intake, and regular assessment of strength and functional capacity, as rapid fat reduction may influence endurance, thermoregulation, and injury risk.

4. Conclusions

Semaglutide (Ozempic) is currently the most effective pharmacological option for obesity treatment. Its integration into Polish clinical practice should follow PTD recommendations, emphasizing patient monitoring, accessibility, and safety. Further long-term studies are needed to assess durability, safety, and overall impact on mortality. Integrating semaglutide therapy with individualized physical activity programs provides the best outcomes for obesity management. This multidisciplinary approach - combining pharmacotherapy, nutrition, and exercise - should be promoted in clinical and sports settings to ensure sustainable health and performance benefits. The synergy between semaglutide therapy and structured physical training may represent a new paradigm in obesity management and sports rehabilitation. Future research should evaluate exercise performance, recovery, and injury risk profiles in individuals undergoing GLP-1-based pharmacotherapy.

The potential role of semaglutide in sports medicine extends beyond weight reduction. Ongoing research is needed to determine its effects on muscle metabolism, energy utilization, and recovery. In the future, GLP-1-based therapies might contribute to personalized interventions for athletes with obesity or metabolic disorders, aligning pharmacological advances with evidence-based exercise strategies. Collaboration between endocrinologists, sports physicians, and physiotherapists will be essential to ensure safe and effective integration of these agents into athletic health management.

REFERENCES

1. Aronne, L. J., Horn, D. B., le Roux, C. W., Ho, W., Falcon, B. L., Gomez Valderas, E., Das, S., Lee, C. J., Glass, L. C., Senyucel, C., & Dunn, J. P. (2025). Tirzepatide as compared with semaglutide for the treatment of obesity. *The New England Journal of Medicine, 393*(1), 26–36. https://doi.org/10.1056/NEJMoa2416394
2. Astrup, A. (2024). Reflections on the discovery of GLP-1 as a satiety hormone: Implications for obesity therapy and future directions. *European Journal of Clinical Nutrition, 78*(7), 551–556. https://doi.org/10.1038/s41430-024-01460-6
3. Frías, J. P., Auerbach, P., Bajaj, H. S., Fukushima, Y., Lingvay, I., Macura, S., Søndergaard, A. L., Tankova, T. I., Tentolouris, N., & Buse, J. B. (2021). Efficacy and safety of once-weekly semaglutide 2.0 mg versus 1.0 mg in patients with type 2 diabetes (SUSTAIN FORTE): A double-blind, randomised, phase 3b trial. *The Lancet Diabetes & Endocrinology, 9*(9), 563–574. https://doi.org/10.1016/S2213-8587(21)00174-1
4. Garvey, W. T., Batterham, R. L., Bhatta, M., Buscemi, S., Christensen, L. N., Frias, J. P., Jódar, E., Kandler, K., Rigas, G., Wadden, T. A., Wharton, S., & STEP 5 Study Group. (2022). Two-year effects of semaglutide in adults with overweight or obesity: The STEP 5 trial. *Nature Medicine, 28*(10), 2083–2091. https://doi.org/10.1038/s41591-022-02026-4
5. Marso, S. P., Bain, S. C., Consoli, A., Eliaschewitz, F. G., Jódar, E., Leiter, L. A., Lingvay, I., Rosenstock, J., Seufert, J., Warren, M. L., Woo, V., Hansen, O., Holst, A. G., Pettersson, J., & Vilsbøll, T. (2016). Semaglutide and cardiovascular outcomes in patients with type 2 diabetes. *The New England Journal of Medicine, 375*(19), 1834–1844. https://doi.org/10.1056/NEJMoa1607141
6. Mozaffarian, D., Agarwal, M., Aggarwal, M., Alexander, L., Apovian, C. M., Bindlish, S., Bonnet, J., Butsch, W. S., Christensen, S., Gianos, E., Gulati, M., Gupta, A., Horn, D., Kane, R. M., Saluja, J., Sannidhi, D., Stanford, F. C., & Callahan, E. A. (2025). Nutritional priorities to support GLP-1 therapy for obesity: A joint advisory from the American College of Lifestyle Medicine, the American Society for Nutrition, the Obesity Medicine Association, and The Obesity Society. *The American Journal of Clinical Nutrition, 122*(1), 344–367. https://doi.org/10.1016/j.ajcnut.2025.04.023
7. World Health Organization. (n.d.). *Obesity and overweight*. Retrieved February 18, 2026, from https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
8. Prado, C. M., Phillips, S. M., Gonzalez, M. C., & Heymsfield, S. B. (2024). Muscle matters: The effects of medically induced weight loss on skeletal muscle. *The Lancet Diabetes & Endocrinology, 12*(11), 785–787. https://doi.org/10.1016/S2213-8587(24)00272-9
9. Qin, W., Yang, J., Deng, C., Ruan, Q., & Duan, K. (2024). Efficacy and safety of semaglutide 2.4 mg for weight loss in overweight or obese adults without diabetes: An updated systematic review and meta-analysis including the 2-year STEP 5 trial. *Diabetes, Obesity and Metabolism, 26*(3), 911–923. https://doi.org/10.1111/dom.15386
10. Riveline, J., Wojtusciszyn, A., Guerci, B., Alves, C., Kao, K., Xu, Y., & Dunn, T. C. (2022). Real-world hypoglycaemia related to glucose variability and flash glucose scan frequency assessed from global FreeStyle Libre data. *Diabetes, Obesity and Metabolism, 24*(11), 2102–2107. https://doi.org/10.1111/dom.14795
11. Rubino, D., Abrahamsson, N., Davies, M., Hesse, D., Greenway, F. L., Jensen, C., Lingvay, I., Mosenzon, O., Rosenstock, J., Rubio, M. A., Rudofsky, G., Tadayon, S., Wadden, T. A., Dicker, D., Friberg, M., Sjödin, A., Segal, G., & Warren, M. L. (2021). Effect of continued weekly subcutaneous semaglutide vs placebo on weight loss maintenance in adults with overweight or obesity: The STEP 4 randomized clinical trial. *JAMA, 325*(14), 1414–1425. https://doi.org/10.1001/jama.2021.3224
12. Ryan, D. H., Lingvay, I., Deanfield, J., Kahn, S. E., Barros, E., Burguera, B., Colhoun, H. M., Cercato, C., Dicker, D., Horn, D. B., Hovingh, G. K., Jeppesen, O. K., Kokkinos, A., Lincoff, A. M., Meyhöfer, S. M., Oral, T. K., Plutzky, J., Van Beek, A. P., Wilding, J. P. H., & Kushner, R. F. (2024). Long-term weight loss effects of semaglutide in obesity without diabetes in the SELECT trial. *Nature Medicine, 30*(7), 2049–2057. https://doi.org/10.1038/s41591-024-02996-7
13. Tzoulis, P., & Baldeweg, S. E. (2024). Semaglutide for weight loss: Unanswered questions. *Frontiers in Endocrinology, 15*, Article 1382814. https://doi.org/10.3389/fendo.2024.1382814
14. Wilding, J. P. H., Batterham, R. L., Calanna, S., Davies, M., Van Gaal, L. F., Lingvay, I., McGowan, B. M., Rosenstock, J., Tran, M. T. D., Wadden, T. A., Wharton, S., Yokote, K., Zeuthen, N., & Kushner, R. F. (2021). Once-weekly semaglutide in adults with overweight or obesity. *The New England Journal of Medicine, 384*(11), 989–1002. https://doi.org/10.1056/NEJMoa2032183
15. Wilding, J. P. H., Batterham, R. L., Davies, M., Van Gaal, L. F., Kandler, K., Konakli, K., Lingvay, I., McGowan, B. M., Oral, T. K., Rosenstock, J., Wadden, T. A., Wharton, S., Yokote, K., Kushner, R. F., & STEP 1 Study Group. (2022). Weight regain and cardiometabolic effects after withdrawal of semaglutide: The STEP 1 trial extension. *Diabetes, Obesity and Metabolism, 24*(8), 1553–1564. https://doi.org/10.1111/dom.14725