



Congresul Național de Medicină Fizică, de Recuperare și Balneoclimatologie

Covasna, 23 – 25 Aprilie 2026



The contribution of physical-spa therapy to the patient with complicated cerebrovascular and degenerative rheumatic pathology

*George Ovidiu Cioroianu¹, Anghel Christian Predeanu²,
Otilia Rogoveanu¹*

1. *Department of Physical Medicine and Rehabilitation, University of Medicine and Pharmacy of Craiova, 200349 Craiova, Romania*
2. *Doctoral School, University of Medicine and Pharmacy of Craiova, 200349 Craiova, Romania*



ACADEMIA DE
ȘTIINȚE
MEDICALE
Experiența doct





Congresul Național de Medicină Fizică, de Recuperare și Balneoclimatologie

Covasna, 23 – 25 Aprilie 2026



Disclosure statement

I have no actual or potential conflict of interest in relation to this program/presentation.



ACADEMIA DE
ȘTIINȚE
MEDICALE
Experiența doct



SOCIETATEA SPECIALISTILOR IN
REABILITARE MEDICALA SI
MEDICINA FIZICA
ROMANIA



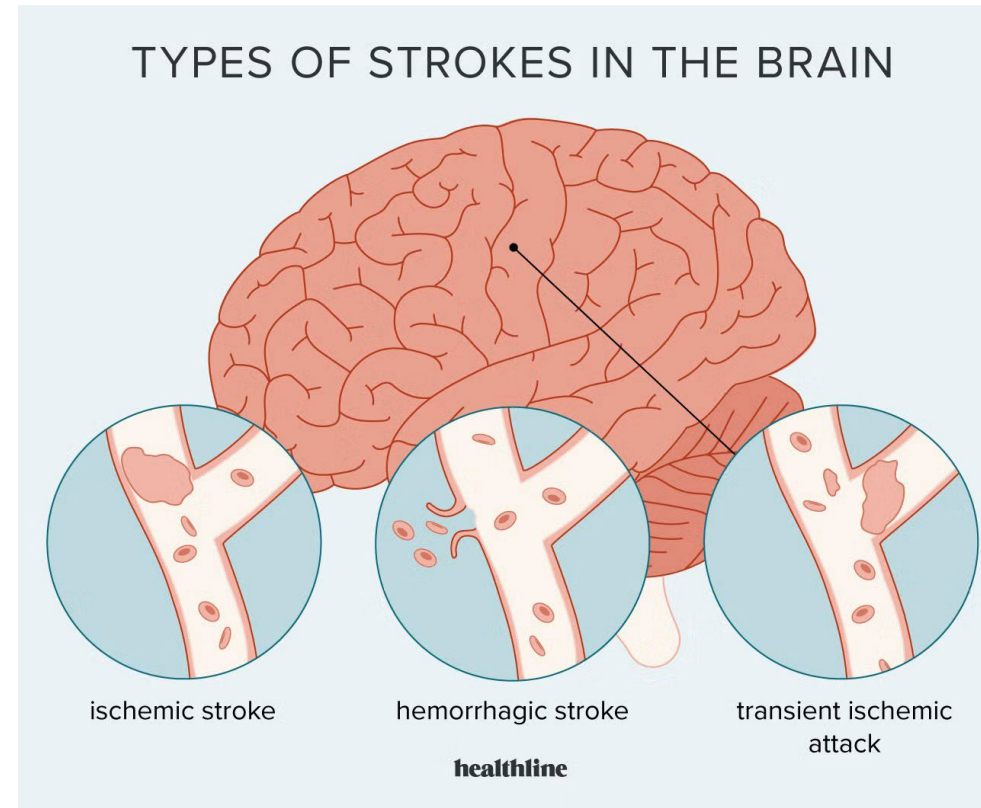
Overview

- ❖ A stroke is a medical emergency that occurs when blood flow to the brain is interrupted, either due to a blockage or bleeding;
- ❖ This lack of blood flow can lead to brain cell death and serious complications;
- ❖ Strokes can be fatal and need immediate treatment.

Overview

❖ The types of strokes are:

- ❖ ischaemic stroke: a blood clot blocks a blood vessel in your brain leading to loss of blood flow;
- ❖ haemorrhagic stroke: intracerebral haemorrhage (ICH) by rupture of a blood vessel in the brain leading to bleeding;
- ❖ transient ischaemic attack (TIA): a short period of symptoms similar to those of a stroke, caused by a brief blockage of blood flow to the brain. A TIA usually lasts only a few minutes and doesn't cause long-term damage.





Overview

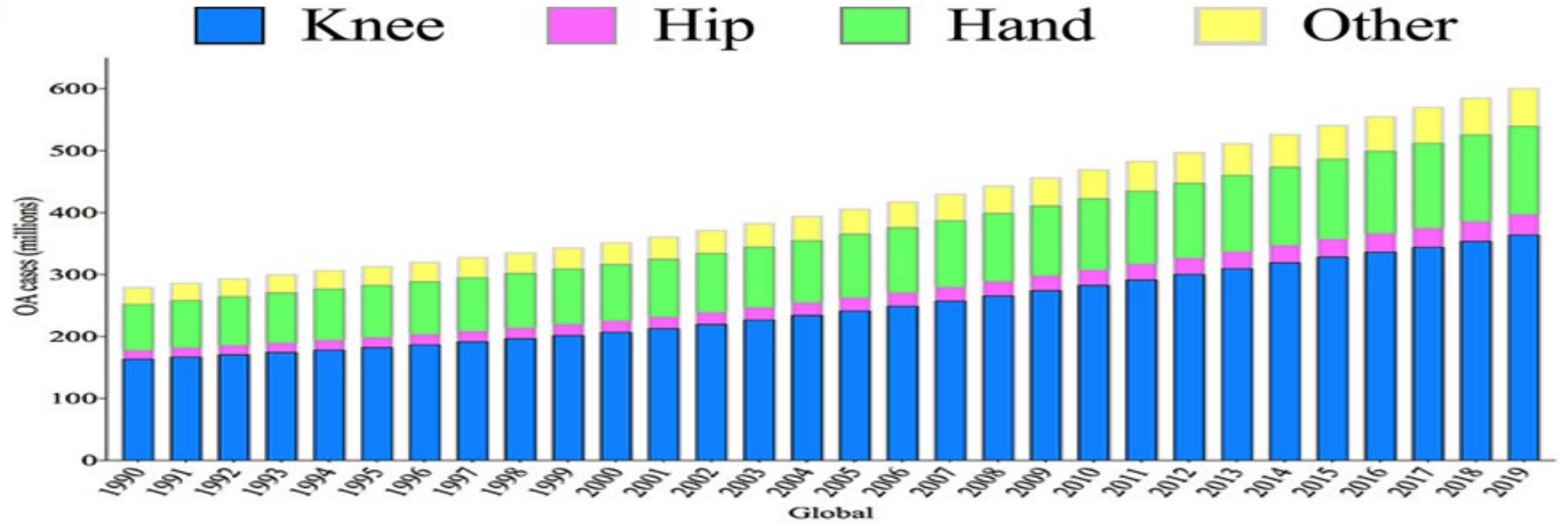
- ❖ In 2021, stroke was the third leading cause of death and disability globally, with an estimated 93.8 million cases;
- ❖ In 2021, there were 11.9 million new cases of stroke;
- ❖ The lifetime risk of stroke has increased by 50 % over the past 20 years, with 1 in 4 adults predicted to experience a stroke in their lifetime.

1. <https://www.who.int/news-room/fact-sheets/detail/stroke>

2. GBD 2021 Stroke Risk Factor Collaborators. Global, regional, and national burden of stroke and its risk factors, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021. The Lancet Neurology. 18 September 2024. doi: 10.1016/S1474-4422(24)00369-7.

Overview

- ❖ Osteoarthritis represents a global issue not only because of its economical burden on the national healthcare systems but also because of its impact on the social life of the patients, which in time can lead to diminished functional capacity and ultimately even to disability;
- ❖ Given the rise in life expectancy and also the never-before-seen heights of obesity among the human population, osteoarthritis incidence is currently at record levels.



Long, Huibin et al. "Prevalence Trends of Site-Specific Osteoarthritis From 1990 to 2019: Findings From the Global Burden of Disease Study 2019." *Arthritis & rheumatology* (Hoboken, N.J.) vol. 74,7 (2022): 1172-1183. doi:10.1002/art.42089



Importance

- ❖ Post-stroke rehabilitation often takes place in older patients with painful degenerative joint disease;
- ❖ Pain, stiffness, fear of movement, and fatigue can reduce training dose and participation.

1. Lauzon J. Prevalence, Impact, and Treatment of Co-Occurring Osteoarthritis in Patients With Stroke Undergoing Rehabilitation. *Stroke*. 2021; doi:10.1161/STROKEAHA.121.034270
2. Doruk P. The impact of knee osteoarthritis on rehabilitation outcomes in hemiparetic stroke patients. *J Back Musculoskeletal Rehabil*. 2013;26(2):207-211. doi:10.3233/BMR-130370
3. Veerbeek JM, van Wegen E, van Peppen R, et al. What is the evidence for physical therapy poststroke? A systematic review and meta-analysis. *PLoS One*. 2014;9(2):e87987. Published 2014 Feb 4. doi:10.1371/journal.pone.0087987

Clinical overlap

- ❖ Reported osteoarthritis prevalence in stroke survivors ranges widely across studies, from 1.9% to 52.2%;
- ❖ The overlap is clinically important, but the evidence base remains sparse and heterogeneous;
- ❖ In daily practice, painful knee, hip, or spine OA should be actively screened in every locomotor post-stroke patient.

Why OA matters after stroke

- ❖ Stroke adds weakness, asymmetry, impaired balance, and slower gait;
- ❖ OA adds pain, stiffness, lower-limb weakness, and loading intolerance;
- ❖ Together, they reduce repetition, gait practice, transfers, endurance, and confidence;
- ❖ The result is a vicious cycle: pain → inactivity → deconditioning → more disability

1. Lauzon J. Prevalence, Impact, and Treatment of Co-Occurring Osteoarthritis in Patients With Stroke Undergoing Rehabilitation. Stroke. 2021; doi:10.1161/STROKEAHA.121.034270
2. Doruk P. The impact of knee osteoarthritis on rehabilitation outcomes in hemiparetic stroke patients. J Back Musculoskelet Rehabil. 2013;26(2):207-211. doi:10.3233/BMR-130370
3. Veerbeek JM, van Wegen E, van Peppen R, et al. What is the evidence for physical therapy poststroke? A systematic review and meta-analysis. PLoS One. 2014;9(2):e87987. Published 2014 Feb 4. doi:10.1371/journal.pone.0087987
4. Rat, AC., Loeuille, D., Vallata, A. et al. Spa therapy with physical rehabilitation is an alternative to usual spa therapy protocol in symptomatic knee osteoarthritis. Sci Rep 10, 11004 (2020). <https://doi.org/10.1038/s41598-020-67436-1>

Impact of OA on post-stroke rehabilitation

- ❖ In a national rehabilitation cohort, OA was associated with a 1.62-day longer length of stay after stroke rehabilitation;
- ❖ OA was also associated with a 1.37-point smaller improvement in FIM between admission and follow-up;
- ❖ The smaller gain was mainly due to less improvement after discharge;
- ❖ Treatment of OA is function-preserving, not symptom-only.

1. Lauzon J. Prevalence, Impact, and Treatment of Co-Occurring Osteoarthritis in Patients With Stroke Undergoing Rehabilitation. *Stroke*. 2021; doi:10.1161/STROKEAHA.121.034270
2. Doruk P. The impact of knee osteoarthritis on rehabilitation outcomes in hemiparetic stroke patients. *J Back Musculoskeletal Rehabil*. 2013;26(2):207-211. doi:10.3233/BMR-130370

What the literature still lacks

- ❖ Very few studies directly test integrated programs in patients with both stroke sequelae and OA;
- ❖ Most available data come from condition-specific cohorts rather than truly mixed cohorts;
- ❖ Therefore, clinical reasoning must integrate two evidence streams:
 - ❑ stroke rehabilitation evidence;
 - ❑ osteoarthritis spa/physical therapy evidence.

1. Lauzon J. Prevalence, Impact, and Treatment of Co-Occurring Osteoarthritis in Patients With Stroke Undergoing Rehabilitation. *Stroke*. 2021; doi:10.1161/STROKEAHA.121.034270
2. Veerbeek JM, van Wegen E, van Peppen R, et al. What is the evidence for physical therapy poststroke? A systematic review and meta-analysis. *PLoS One*. 2014;9(2):e87987. Published 2014 Feb 4. doi:10.1371/journal.pone.0087987
3. Sangha H, Lipson D, Foley N, et al. A comparison of the Barthel Index and the Functional Independence Measure as outcome measures in stroke rehabilitation: patterns of disability scale usage in clinical trials. *Int J Rehabil Res*. 2005;28(2):135-139. doi:10.1097/00004356-200506000-00006
4. Fraioli A, Mennuni G, Fontana M, et al. Efficacy of Spa Therapy, Mud-Pack Therapy, Balneotherapy, and Mud-Bath Therapy in the Management of Knee Osteoarthritis. A Systematic Review. *Biomed Res Int*. 2018;2018:1042576. Published 2018 Jun 25. doi:10.1155/2018/1042576
5. Forestier R, Debais F, Michel N, Schueller R, Juhel C. The effectiveness of a 3-week spa therapy on the 6-month mobility and functional ability of patients with knee osteoarthritis: the ANGELLO randomized controlled trial. *Int J Biometeorol*. 2025;69(7):1715-1724. doi:10.1007/s00484-025-02927-2
6. Rat, AC., Loeuille, D., Vallata, A. et al. Spa therapy with physical rehabilitation is an alternative to usual spa therapy protocol in symptomatic knee osteoarthritis. *Sci Rep* 10, 11004 (2020). <https://doi.org/10.1038/s41598-020-67436-1>

What physical therapy clearly does after stroke

- ❖ Strong evidence supports intensive, repetitive, task-oriented, task-specific training after stroke;
- ❖ Earlier rehabilitation improves self-care, daily activities, and neurological outcomes versus delayed rehabilitation;
- ❖ Active rehabilitation remains the core treatment in the mixed cerebrovascular-rheumatic patient.

Outcome domains to monitor

- ❖ Stroke function: Barthel Index or FIM, gait speed, FAC, TUG, 6MWT;
- ❖ Rheumatic burden: VAS/NRS pain, WOMAC pain/stiffness/function, ROM, analgesic use;
- ❖ Participation: transfers, stair negotiation, community ambulation, confidence, sleep, quality of life;
- ❖ Reassess at baseline, end of program, and follow-up.

1. Lauzon J. Prevalence, Impact, and Treatment of Co-Occurring Osteoarthritis in Patients With Stroke Undergoing Rehabilitation. *Stroke*. 2021; doi:10.1161/STROKEAHA.121.034270
2. Sangha H, Lipson D, Foley N, et al. A comparison of the Barthel Index and the Functional Independence Measure as outcome measures in stroke rehabilitation: patterns of disability scale usage in clinical trials. *Int J Rehabil Res*. 2005;28(2):135-139. doi:10.1097/00004356-200506000-00006
3. Fraioli A, Mennuni G, Fontana M, et al. Efficacy of Spa Therapy, Mud-Pack Therapy, Balneotherapy, and Mud-Bath Therapy in the Management of Knee Osteoarthritis. A Systematic Review. *Biomed Res Int*. 2018;2018:1042576. Published 2018 Jun 25. doi:10.1155/2018/1042576
4. Forestier R, Debiais F, Michel N, Schueller R, Juhel C. The effectiveness of a 3-week spa therapy on the 6-month mobility and functional ability of patients with knee osteoarthritis: the ANGELLO randomized controlled trial. *Int J Biometeorol*. 2025;69(7):1715-1724. doi:10.1007/s00484-025-02927-2
5. Rat, AC., Loeuille, D., Vallata, A. et al. Spa therapy with physical rehabilitation is an alternative to usual spa therapy protocol in symptomatic knee osteoarthritis. *Sci Rep* 10, 11004 (2020). <https://doi.org/10.1038/s41598-020-67436-1>

Why consider spa-based care in osteoarthritis

- ❖ Systematic reviews show improvement in pain and function after spa/balneotherapy in osteoarthritis, especially knee OA;
- ❖ Potential contributors include thermal effects, buoyancy, unloading, supervised movement, relaxation, and adherence support;
- ❖ The best evidence base is for knee OA; extrapolation to hip and spine OA should be cautious;

How the positive effects of balneotherapy translate on the post-stroke patient

- ❖ Goal 1: reduce pain enough to increase rehabilitation dose.
- ❖ Goal 2: improve loading tolerance, ROM, weight transfer, and confidence.
- ❖ Goal 3: protect gait, transfers, standing tolerance, and home independence.
- ❖ In this population, balneotherapy therapy should facilitate active neurorehabilitation, not replace it.

1. Lauzon J. Prevalence, Impact, and Treatment of Co-Occurring Osteoarthritis in Patients With Stroke Undergoing Rehabilitation. Stroke. 2021; doi:10.1161/STROKEAHA.121.0342702
2. https://www.femteconline.org/Hydroglobe/Consensus-Paper_it.pdf
3. Veerbeek JM, van Wegen E, van Peppen R, et al. What is the evidence for physical therapy poststroke? A systematic review and meta-analysis. PLoS One. 2014;9(2):e87987. Published 2014 Feb 4. doi:10.1371/journal.pone.0087987
4. Rat, AC., Loeuille, D., Vallata, A. et al. Spa therapy with physical rehabilitation is an alternative to usual spa therapy protocol in symptomatic knee osteoarthritis. Sci Rep 10, 11004 (2020). <https://doi.org/10.1038/s41598-020-67436-1>

How the positive effects of balneotherapy translate on the post-stroke patient

- ❖ Best candidates are medically stable patients whose OA symptoms clearly limit active rehabilitation;
- ❖ The selection rule is simple: prescribe spa-based care when OA pain is the main barrier to active rehabilitation and safety is acceptable.

Who is not a good candidate today

- ❖ Practical exclusions include unstable cardiovascular disease, active infection, active cancer-related medical instability, severe uncontrolled comorbidity, or inability to tolerate the environment safely;
- ❖ Also reconsider if severe cognitive/behavioral problems prevent participation in active therapy;
- ❖ Reassess once medical stability and participation capacity improve.

Baseline assessment before the program

- ❖ Stroke profile: paresis, balance, neglect, spasticity, fatigue, fall risk.
- ❖ OA profile: main painful joint, stiffness, swelling, ROM, weight-bearing tolerance;
- ❖ Functional profile: BI/FIM, gait speed, FAC/TUG, stairs, VAS, WOMAC;
- ❖ Medical profile: blood pressure, cardiovascular tolerance, skin status, medications, thrombosis risk;

Core program components

- ❖ Kinetotherapy: task-specific gait, transfers, sit-to-stand, stair practice, lower-limb strengthening, balance;
- ❖ Hydrotherapy/aquatic exercise: unloaded gait, ROM, confidence, low-impact endurance;
- ❖ Balneotherapy: mineral baths, mud applications, hydrojet, supervised pool mobilization where available;
- ❖ Education: pacing, home exercise, joint protection, adherence, weight management.

1. Sangha H, Lipson D, Foley N, et al. A comparison of the Barthel Index and the Functional Independence Measure as outcome measures in stroke rehabilitation: patterns of disability scale usage in clinical trials. *Int J Rehabil Res*. 2005;28(2):135-139. doi:10.1097/00004356-200506000-00006
2. Fraioli A, Mennuni G, Fontana M, et al. Efficacy of Spa Therapy, Mud-Pack Therapy, Balneotherapy, and Mud-Bath Therapy in the Management of Knee Osteoarthritis. A Systematic Review. *Biomed Res Int*. 2018;2018:1042576. Published 2018 Jun 25. doi:10.1155/2018/1042576
3. https://www.femteconline.org/Hydroglobe/Consensus-Paper_it.pdf
4. Rat, AC., Loeuille, D., Vallata, A. et al. Spa therapy with physical rehabilitation is an alternative to usual spa therapy protocol in symptomatic knee osteoarthritis. *Sci Rep* 10, 11004 (2020). <https://doi.org/10.1038/s41598-020-67436-1>

Hydrotherapy in the mixed patient

- ❖ Warm water can unload painful joints and make stepping, balance, ROM, and endurance practice easier;
- ❖ Use pool walking, sit-to-stand, step practice, hip/knee ROM, and low-impact aerobic blocks;
- ❖ Transfer gains back to land on the same day whenever possible;
- ❖ Hydrotherapy is most useful when pain or fear blocks early land-based repetition.

1. https://www.femteonline.org/Hydroglobe/Consensus-Paper_it.pdf
2. Rat, AC., Loeuille, D., Vallata, A. et al. Spa therapy with physical rehabilitation is an alternative to usual spa therapy protocol in symptomatic knee osteoarthritis. Sci Rep 10, 11004 (2020). <https://doi.org/10.1038/s41598-020-67436-1>

Electrotherapy

- ❖ Consider electrotherapy only as an adjunct when pain prevents active exercise;
- ❖ Use it to open an exercise window, not as a stand-alone treatment;
- ❖ Reassess quickly and stop non-responders;
- ❖ Do not let passive modalities replace strengthening, gait, balance, and home exercise.

Limitations of the evidence

- ❖ Direct evidence in patients with both stroke sequelae and OA remains scarce and mostly low quality;
- ❖ Spa interventions are heterogeneous: water composition, mud, temperature, exercise content, dose, and follow-up vary;
- ❖ Long-term data on falls, cost-effectiveness, and stroke-specific subgroups are still limited;
- ❖ The strongest evidence is in knee OA, not across all degenerative rheumatic conditions.

1. Lauzon J. Prevalence, Impact, and Treatment of Co-Occurring Osteoarthritis in Patients With Stroke Undergoing Rehabilitation. *Stroke*. 2021; doi:10.1161/STROKEAHA.121.034270
2. Fraioli A, Mennuni G, Fontana M, et al. Efficacy of Spa Therapy, Mud-Pack Therapy, Balneotherapy, and Mud-Bath Therapy in the Management of Knee Osteoarthritis. A Systematic Review. *Biomed Res Int*. 2018;2018:1042576. Published 2018 Jun 25. doi:10.1155/2018/1042576
3. https://www.femteonline.org/Hydroglobe/Consensus-Paper_it.pdf
4. Rat, AC., Loeuille, D., Vallata, A. et al. Spa therapy with physical rehabilitation is an alternative to usual spa therapy protocol in symptomatic knee osteoarthritis. *Sci Rep* 10, 11004 (2020). <https://doi.org/10.1038/s41598-020-67436-1>
5. Forestier R, Debais F, Michel N, Schueller R, Juhel C. The effectiveness of a 3-week spa therapy on the 6-month mobility and functional ability of patients with knee osteoarthritis: the ANGELLO randomized controlled trial. *Int J Biometeorol*. 2025;69(7):1715-1724. doi:10.1007/s00484-025-02927-2

Practical recommendations for PRM clinicians

- ❖ Screen early for painful osteoarthritis in every locomotor post-stroke patient;
- ❖ Use spa/physical modalities to increase active therapy dose, not to replace it;
- ❖ Prefer multimodal blocks: education + exercise + gait practice + pool/spa modalities;
- ❖ Measure both neurologic and rheumatic outcomes;
- ❖ Continue home exercise and booster sessions after discharge.

Conclusions

- ❖ Osteoarthritis can meaningfully blunt post-stroke functional recovery;
- ❖ Physical therapy remains the core treatment after stroke;
- ❖ Spa-based multimodal care has the best supporting evidence in OA, with benefits on pain and function over medium-term follow-up;
- ❖ In selected patients, physical-spa therapy is best understood as a facilitator of participation in rehabilitation.



Vă Mulțumesc!