

**Effects of moderate whole-body hyperthermia and complementary medicine in the treatment of rheumatoid arthritis: a preliminary study**

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**Presented at 35<sup>th</sup> ICHS, Guangzhou, 2017**

**Cite this article as:**

Agrawal P. (2018): Effects of moderate whole-body hyperthermia and complementary medicine in the treatment of rheumatoid arthritis: a preliminary study; *Oncothermia Journal* 22: 103-115

[www.oncothermia-journal.com/journal/2018/Effects\\_of\\_moderate.pdf](http://www.oncothermia-journal.com/journal/2018/Effects_of_moderate.pdf)

# Effects of moderate whole-body hyperthermia and complementary medicine in the treatment of **rheumatoid arthritis**: a preliminary study

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## The Burden of Rheumatoid Arthritis

- Systemic inflammatory disease<sup>1</sup>
- Autoimmune etiology<sup>1</sup>
- Affects 2 million people in the United States<sup>1</sup>
  - Age of onset 30-60 years
- Lifetime cost approaches that of cardiovascular diseases<sup>2</sup>
- Associated with an increased mortality risk<sup>3</sup>

1. Arthritis Foundation; At: <http://www.arthritis.org>  
2. Kvien. *Pharmacoeconomics*. 2004;22(suppl 2):1.  
3. Gabriel et al. *Arthritis Rheum*. 2003;48:54.

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## Clinical Course of RA

- Chronic and progressive disease
- 50% of patients have irreversible joint damage at 2 years
  - The true cause of late disability
- If not treated early and aggressively, RA leads to
  - Increasing joint destruction and deformity
  - Progressive physical disability
  - Reduced QOL

Doran et al. *Arthritis Rheum.* 2002;46:625;  
Hulsmans et al. *Arthritis Rheum.* 2000;43:1927;  
Marra. *Am J Health Syst Pharm.* 2006;63:54.

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## The Clinical Spectrum of RA



Early PIP swelling



Active with  
some deformity



Late-stage  
deformities

Images courtesy of J. Cush, 2005.

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# Therapeutic Aim in RA

- Signs and symptoms
  - Improvement
  - Remission
- Joint damage
  - Retardation
  - Prevention
  - Reversal
- Disability
  - Improvement
  - Prevention
  - Reversal
- Requires a comprehensive approach
  - Type of intervention
  - Timing
  - Follow-up management
  - Assessment of comorbid conditions

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## Global RA Management Goals

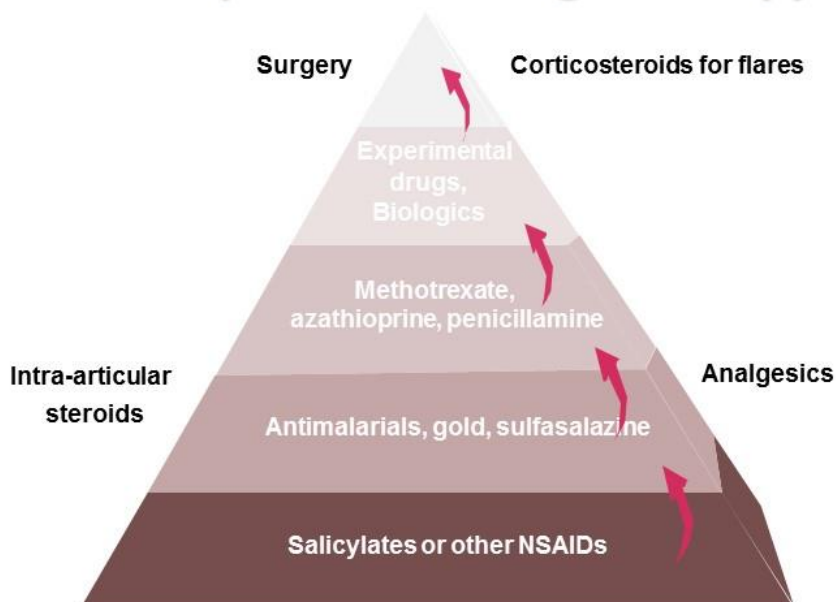
- **Prevent** or control joint damage
- **Prevent** loss of function
- **Decrease** pain
- **Treat** co-morbidities along with RA
- **Improve** functional status and quality of life

*The ideal objective: disease remission*

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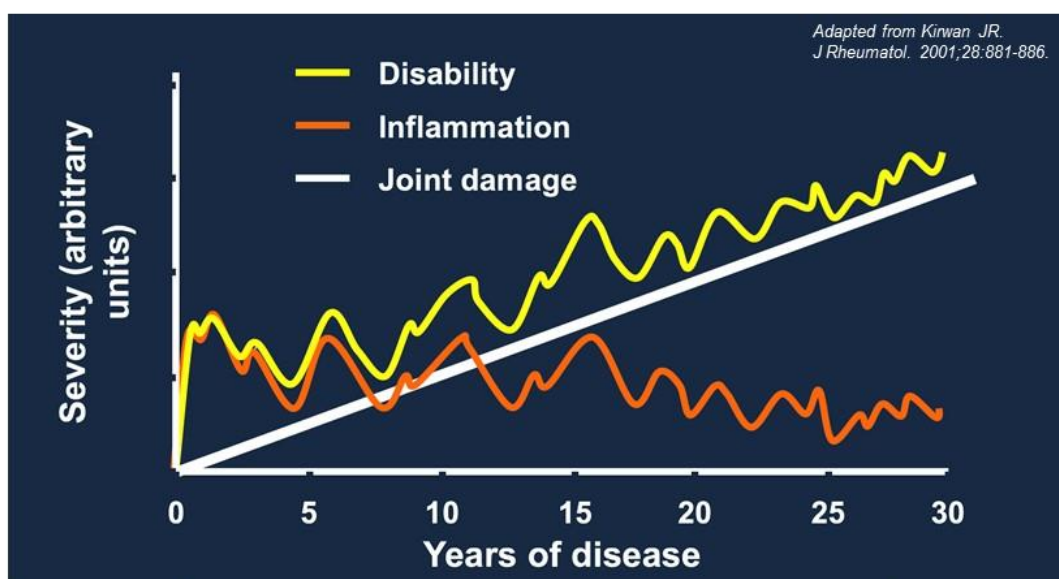
# The Traditional Treatment Pyramid for RA: Sequential Drug Therapy



Adapted from *Primer on Rheumatic Diseases*, 10th ed. The Arthritis Foundation; 1993.

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Inflammatory joint symptoms determine disability early in disease

Effect of joint destruction dominates disability late in disease



Holistic  
Integrative  
complementary  
Traditional  
CAM  
alternative

- **60% to 90%** of persons with arthritis, particularly those with rheumatoid arthritis, have **used complementary and alternative medicine**<sup>1</sup>
- The rationale for the use of some therapies is supported by consistent evidence.

*1. Rao JK, et al. Annals of internal medicine 1999: 409-416.*

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## Study methods

8 patients with clinically diagnosed RA included in the preliminary study

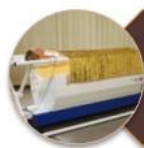
4-weeks treatment

Pain, stiffness and fatigue measured on a 100-mm VAS

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# Treatment program



Whole-Body Hyperthermia  
4 sessions (once weekly)



Ozone Major Autohemotherapy  
8 sessions (twice weekly)



Intravenous Vitamin C  
8 sessions (twice weekly)



Individual Nutrition Counselling  
2 sessions

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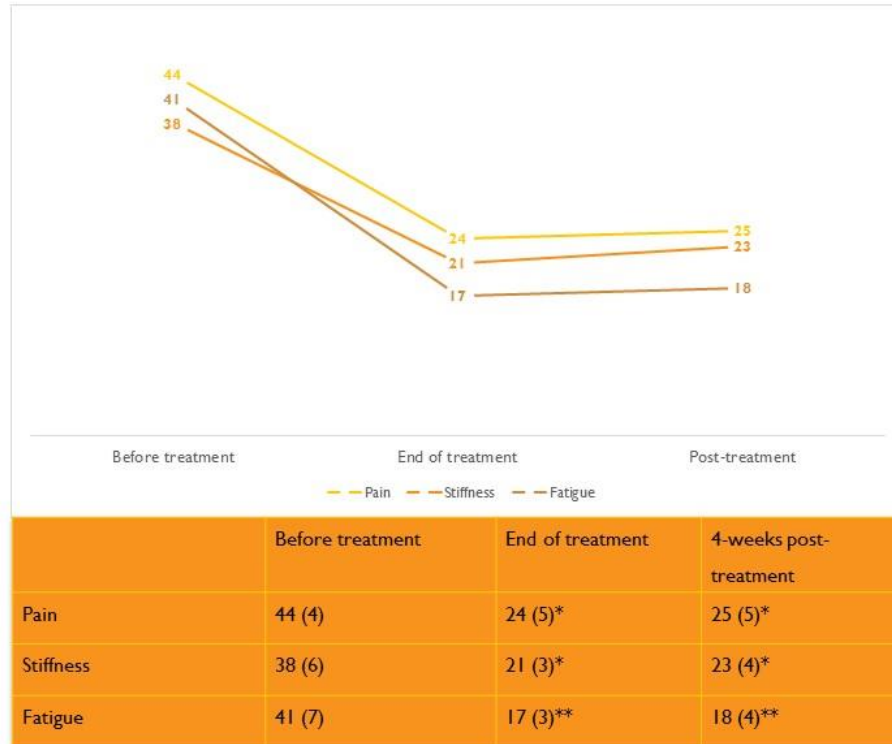


## Results

Gender	2 males, 6 females
Age	51 yrs. [SD=11.21; range=33-63]
Disease duration	8.2 yrs. [SD=6.36; range=1-17]

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VAS, 0–100 mm; mean (SD), \*p<0.05; \*\* p<0.01 vs. before treatment

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## The rationale for the therapy: whole-body hyperthermia



- Heat treatment in patients with rheumatic disorders has been used through the ages
- Evidence from clinical studies documented its beneficial effects in RA<sup>1,2</sup>
- Pain and stiffness decrease and grip strength and range of motion improve after application of local hyperthermia<sup>3</sup>
- Studies report beneficial effects of whole-body hyperthermia (WBH)<sup>4</sup>

1. French SD, Cochrane Database of Systematic Reviews 2006, 2. Osterveld FG, Semin Arthritis Rheum 1994;24:82-90.  
 3. Sukenik S, Isr J Med Sci 1997;33:258-61  
 4. Verhagen AP, Cochrane Database of Systematic Reviews 2004

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# The rationale for the therapy: ozone major autohemotherapy



Carried out worldwide millions of times without side-effects and with therapeutic results<sup>1</sup>

Immunosuppressive action if it is used at high concentration (45-65 µg/ml)<sup>2</sup>

Studies described its anti-inflammatory and analgesic effects<sup>3,4</sup>

Ozone applied externally ameliorated the inflammatory reaction of RA without toxicity or serious side effects<sup>5</sup>

1. Bocci, V. Springer Science & Business Media 2013.
2. Plopper CG Toxicol Appl Pharmacol 1994;127(1):124-31.
3. Christian DL. Am J Respir Crit Care Med 1998;158:532-537
4. Clavo B, J Altern Complement Med 2003;9:251-6
5. Chang et al. Rheumatol Int (2005) 26: 142.

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# The rationale for the anti-inflammatory therapy



Oxidative stress and severe systemic inflammation have been considered as important pathophysiologic mechanisms involved in the development of RA<sup>1,2</sup>

Significantly elevated production of reactive oxygen species (ROS) in the serum of RA patients<sup>3</sup>

ROS are indirectly involved in joint damage as the secondary messengers in inflammatory and immunological cellular response in RA, which also can degrade directly the joint cartilage, influencing its proteoglycan and inhibiting its synthesis<sup>4,5</sup>

1. Matyska-Plekarska E, Postepy Hig Med Dosw 2006; 60: 617- 623.
2. Filippin LJ, Clin Exp Immunol 2008; 152: 415-422.
3. Mateen S, PLoS One 2016; 11: e0152925.
4. Mirshafiey A, Iran J Allergy Asthma Immunol 2008; 7: 195-202.
5. Hadjigogos K, Panminerva Med 2003; 45: 7-13.

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# IVC and Nutrition counselling



- 1. Vitamin C has direct antioxidant capacity and contributes to the protection of cells from the damaging effects of endogenously produced or exogenous reactive oxygen radicals<sup>1</sup>
- 2. IVC provides indirect antioxidant protection by regenerating other biologically important antioxidants such as glutathione and vitamin E to their active state<sup>2</sup>
- 3. Clinical benefit has been noted for high-dose omega-3 fatty acids, fasting, vegetarian diet, and Mediterranean-type diet<sup>3,4</sup>
- 4. Foods affect RA symptoms; blueberries and spinach were most often noted to improve RA, while soda with sugar and desserts were most commonly reported to worsen RA<sup>5</sup>
- 5. The Western-type diet, which is high in red meat, high-fat dairy products, refined grains, and simple carbohydrates, has been associated with higher levels of CRP and IL-6<sup>6</sup>

1. Carr AC et al, *Am J Clin Nutr* 1999; 69: 1086–1107.  
 2. Ames BN et al, *Proc Natl Acad Sci USA* 1993; 90: 7915–7922.  
 3. Panush RS et al, *Arthritis and Rheumatism* 1983;26:462-71.  
 4. Kremer JM et al, *Arthritis and Rheumatism* 1995;38:1107-14.  
 5. Tedeschi, et al *Arthritis Care & Research* 2017 doi:10.1002/acr.23225  
 6. Esmailzadeh A et al, *J Nutr*. 2007;137:992–8

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## Mediterranean Diet Pyramid

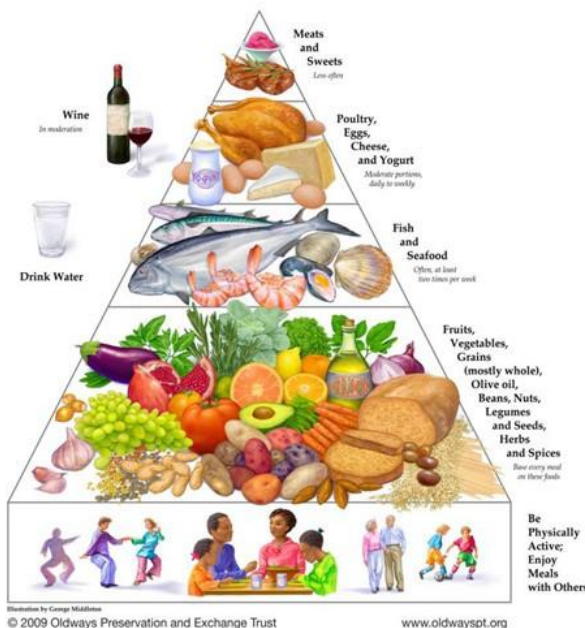


Illustration by George Mialheas  
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[www.oldwayspt.org](http://www.oldwayspt.org)



- Anti-inflammatory Mediterranean diet has been associated with lower levels of inflammation: **(reduced serum hs-CRP, IL-6, IL-7, IL-18, insulin resistance)**<sup>1-4</sup>
- Specific nutrients such as (n-3) fatty acids, fiber, moderate alcohol intake, vitamin C,  $\beta$ -carotene, and magnesium have also consistently been shown to be associated with lower levels of inflammation<sup>5-8</sup>

1. Dalziel K, *J Nutr*. 2006;136:1879–85.  
 2. Chrysahou C, *J Am Coll Cardiol*. 2004;44:152–8.  
 3. Esposito K, *JAMA*. 2004;292:1440–6.  
 4. Estruch R, *Ann Intern Med*. 2006;145:1–11.  
 5. Gao X, *J Nutr*. 2004;134:913–8.  
 6. Watzl B, *Am J Clin Nutr*. 2005;82:1052–8.  
 7. Esmailzadeh A, Kimiagar M, Mehrabi Y, Azadbakht L, Hu FB, Willett WC, *Am J Clin Nutr*. 2006;84:1489–97.  
 8. Ferrucci L, *J Clin Endocrinol Metab*. 2006;91:439–46.

## Conclusions

Significant improvement was seen at the end of the 4-weeks treatment and one month post-treatment

Pain and stiffness reduced over 40%, while fatigue nearly 60% for patients with RA

The treatment was found to be safe and did not relate with any adverse events

The results may become a platform for future planning of studies with the complementary treatments in combination with standard therapies in RA.

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RECEPTION

LOBBY



TREATMENT ROOMS

HALL



WHOLE-BODY HYPERTHERMIA

ORIENTAL THERAPIES

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