

---

# Preliminary Outcome Analysis Monochromatic Infra Red Radiation Treatment (Anodyne)

Team Rehabilitation  
Farmington Hills, Southgate, St Clair Shores  
Phone 313-268-3466, Fax 586-771-4993

# Outline of the Study

---

- ◆ This study is an analysis of the outcomes experienced by all patients treated with monochromatic infra red energy at all three Team Rehabilitation clinics between September 2004 and April 30<sup>th</sup> 2005.
- ◆ The study is not placebo controlled
- ◆ There were no special protocols for treatment or data collection
- ◆ This is simply an analysis of clinical charts from patients seen during a seven month period
- ◆ Thus, we can not tell whether the outcomes are a result of monochromatic infra red treatments, or some other aspect of the physical therapy intervention.

# Patient Population

---

- ◆ The table below shows the demographics of the patient sample

Diagnosis	Total Patients	Average Age	Std Dev Age	Minimum Age	Maximum Age	Male	Female
Diabetic Neuropathy	31	66.0	11.8	36	84	14	17
Peripheral Neuropathy	22	69.5	12.8	37	90	13	9
Total Neuropathies	53	67.5	12.3	36	90	27	26
All other diagnoses	7	Not analyzed					

- ◆ We have only analyzed the outcomes for neuropathies
- ◆ 5 of the neuropathy patients cancelled treatment within 4 visits and are not included in the analysis
- ◆ The neuropathies of 50 of the patients affected their lower extremities, 3 showed symptoms in the hands and forearms.

# Treatment

---

- ◆ The neuropathy patients received an average of 13.4 treatments
  - 2.4 times a week on average
  - Over an average period of 5.6 weeks
  - Generally the clinics attempted to schedule 3 time a week
- ◆ Treatments consisted of various blends of
  - Monochromatic infra red (anodyne) for 30 to 45 minutes
  - Balance exercises
  - Gait training
  - Stretching, strengthening and aerobic exercise
  - Soft tissue mobilization/massage

# The Science Of Anodyne

---

- ◆ The science behind anodyne therapy is not yet fully understood
- ◆ The following mechanism is proposed
  - 890nm (near infra red) penetrates skin and lean tissue fairly well
  - It is thought that it is absorbed by nitrosothiols in red blood cells causing breakdown and the release of NO which causes vasodilation.
  - Improved microcirculation as a result of monochromatic near infra red irradiation is well documented <sup>(1)</sup>
  - Improved nerve conduction has also been documented <sup>(2)</sup>, although it is not clear whether this is a secondary effect of improved circulation
- ◆ It is thought that improved circulation reduces damage to peripheral nerves resulting in improvements in balance and protective sensation

# Results Analyzed

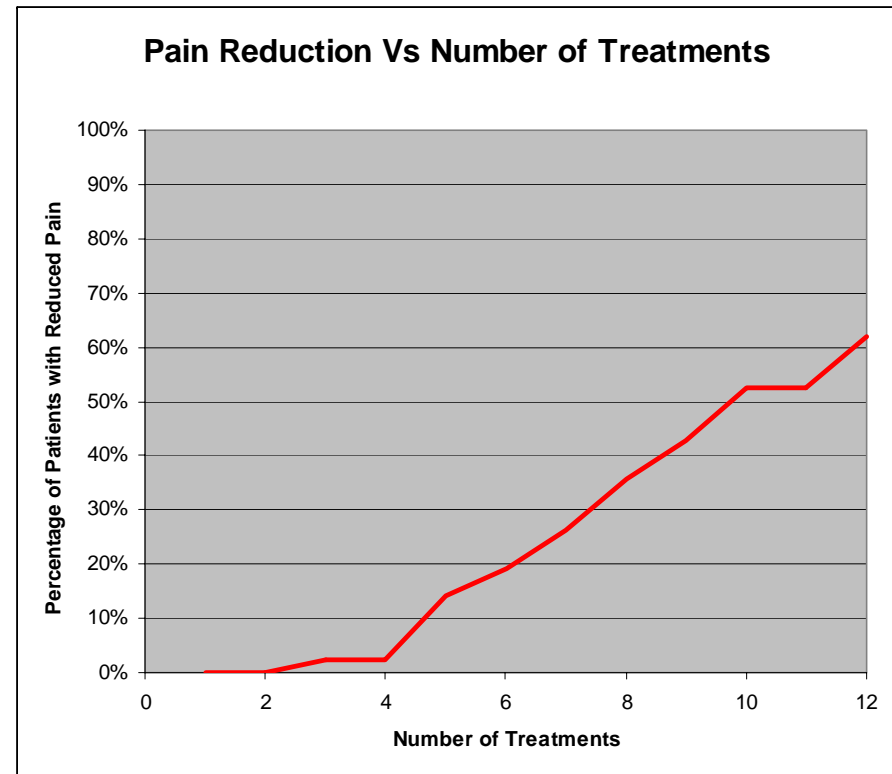
---

- ◆ We have attempted to quantify the effect of this treatment on
  - Pain levels
  - Balance
  - Loss of protective sensation
  - Function
    - » Typically these patients are experiencing difficulties with walking, negotiating stairs, transfers and sleeping secondary to numbness, pain, tingling or burning sensations.

# Pain Levels

---

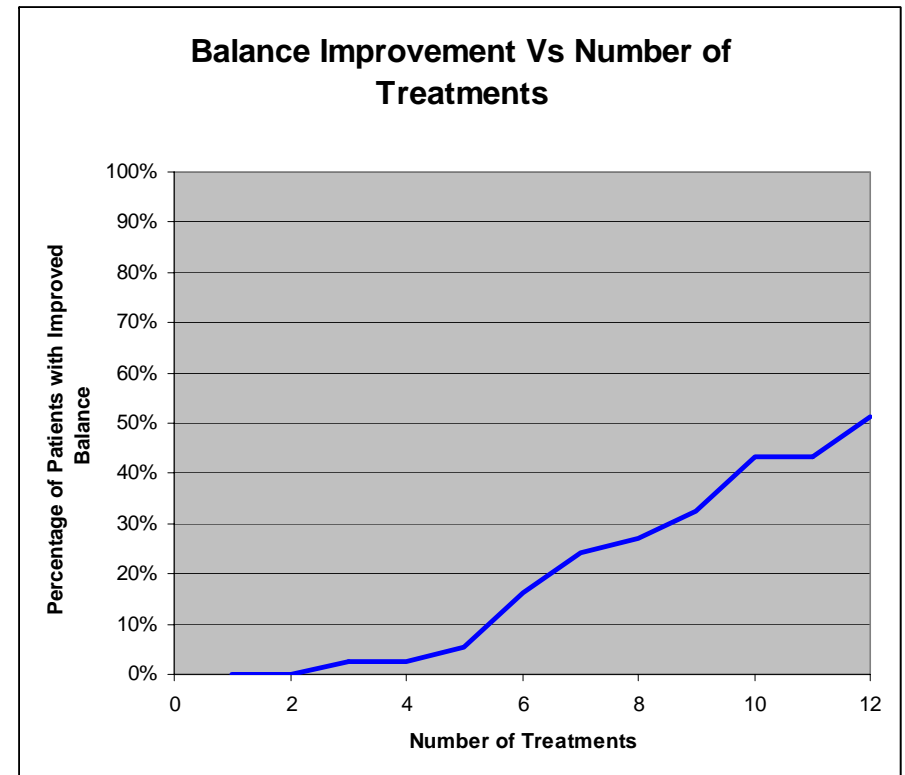
- ◆ 42 patients presented with pain
  - Average level 7.2
  - Maximum 10
  - Minimum 1
- ◆ Within 12 treatments 62% reported a reduction in pain
  - Average reduction was 2.5 levels
  - Only 19% of patients experienced relief from pain within 6 visits
  - It is clearly important to encourage patients to persist with treatment.
- ◆ The graph shows the percentage of patients experiencing pain relief against the number of treatments completed



# Balance

---

- ◆ 37 of the patients presented with measurable balance deficits
  - Measured by Tinetti score or graded poor, fair, good
  - Median rating on admission was Poor +
- ◆ 51% showed improvement by the 12<sup>th</sup> treatment
  - Average improvement 0.85 grades
  - Median rating at 12 visits was Fair +
- ◆ Again, as the graph shows, there is a steady increase in the proportion of patients showing improvement with number of treatments



# Loss of Sensation, Function

---

## ◆ Loss of Sensation

- Lack of sensation was measured at initial evaluation on roughly 50% of patients using 5.07 Semmes Weinstein Monofilament to assess the balls of the feet, pads of the toes and heel.
- Unfortunately, there are too few repeat measurements in the sample to draw quantitative conclusions
- A high proportion of patients report subjective feelings of improved sensation by the 12<sup>th</sup> visit.

## ◆ Function

- The functional issues addressed by the therapy were varied.
- Further analysis is needed before we can make quantitative statements.
- A high percentage of patients showed improvement in safety (gait, ability to negotiate stairs) and ability to sleep due to reduced pain or paresthesia.

# Other Points

---

- ◆ There appears to be no correlation between outcomes and
  - Patient age
  - Years since onset of the neuropathy
- ◆ This may be due to the small sample size and limitations in the data collection.

# Conclusions

---

- ◆ This study can not determine whether the improvement seen was due to
  - Placebo effect
  - Monochromatic infra red
  - Other elements of the PT treatment
- ◆ It does appear to show that a combination of monochromatic infra red with PT reduces pain and improves balance in over half of patients with
  - Peripheral neuropathy
  - Diabetic peripheral neuropathy
- ◆ Other studies have shown:
  - That monochromatic infra red has a significant effect in improving sensation in the feet of subjects with diabetic neuropathy (placebo controlled and blinded) <sup>(3)</sup>
  - Treatments similar to those we have used reduced pain, improved balance and reduced falls <sup>(4)</sup> , thereby improving quality of life and reducing health care costs.

# Conclusions

---

- ◆ Based on these results, monochromatic infra red combined with PT seems to be an effective treatment, providing at least temporary relief from the symptoms of a progressive, debilitating disease.
- ◆ It is important that the patients realize
  - Exercise is part of the treatment protocol, there are no results linking monochromatic infra red treatment alone to:
    - » Improved function
    - » Improved objective balance assessments
  - Only 20% of subjects experience improvement in the first 6 treatments, this climbs rapidly to between 50% and 60% by the 12<sup>th</sup> treatment.

# What Should We do Next?

---

- ◆ To improve our understanding of monochromatic infrared?
- ◆ To earn the right to work with you and your patients?

# References

---

1. Maegawa, Itoh, Hosokawa, Yaegashi, Nishi. Effects of Near Infrared Low Level Laser Irradiation on Microcirculation. *Lasers Surg Med.* 2000;27:427-437
2. Noble, Lowe, Baxter. Monochromatic Infrared Radiation (890nm): Effect of a Multisource Array upon Conduction in the Human Median Nerve. *J Clin Laser Med Surg.* 2001;19:291-295
3. Leonard, Faroqui, Myers. Restoration of Sensation, Reduced Pain and Improved Balance among Subjects with Diabetic Peripheral Neuropathy. *Diabetes Care,* 2004;27(1):168-172
4. Kochman. Monochromatic Infrared Photo Energy and Physical Therapy for Peripheral Neuropathy: Influence on Sensation, Balance and Falls. *J Geriatric Phy Ther,* 2004;27(1):16-19