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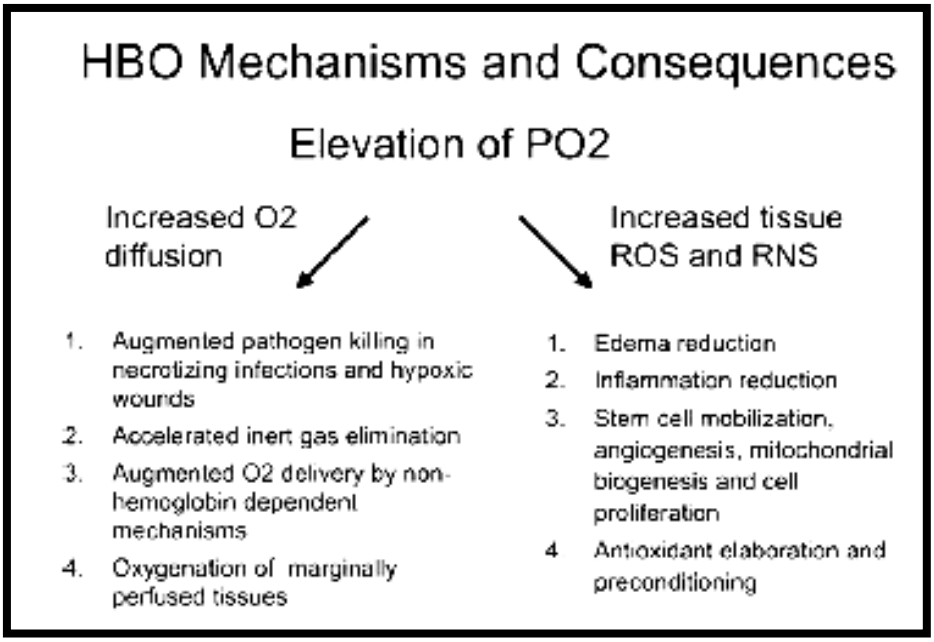
Introduction:

1. Bisphosphonates suppress bone turnover by disrupting osteoclast signal transduction, maturation, and longevity.
   - ✓ BP drugs can be divided into 2 pharmacologic classes: non-amino-BPs (tiludronate, clodrinate, and etidronate) and amino-BPs (risedronate, ibandronate, pamidronate, and alendronate)that have nitrogen-containing groups
2. In some patients, it has been hypothesized that suppressed turnover can impair oral wound healing, leading to a distressing, osteopetrosis-like jaw necrosis called bisphosphonate-related osteonecrosis of the jaws (BRONJ).
   - ✓ BRONJ MECHANISMS: BP therapy targets OCs, and it is prescribed to suppress bone resorption; however, bone resorption is a necessary component of bone turnover and is critical to oral wound healing
   - ✓ BRONJ MANAGEMENT: Current treatment recommendations are nonspecific or reactive and include preventive dentistry before the initiation of BP therapy, control of secondary infection, debridement limited to soft-textured sequestrated bone, and less invasive endodontic techniques
3. Hyperbaric oxygen (HBO), as an adjunct to surgery and antibiotics, might have utility in the treatment of BRONJ because it produces reactive oxygen and nitrogen species that positively modulate the redox-sensitive intracellular signaling molecules involved in bone turnover.

Potential Role of HBO in Treatment of BRONJ

1. If a randomized controlled trial shows HBO to be effective for the treatment of BRONJ, a plausible mechanistic hypothesis is that HBO counteracts BP suppression of bone turnover, thereby restoring more normal wound healing.

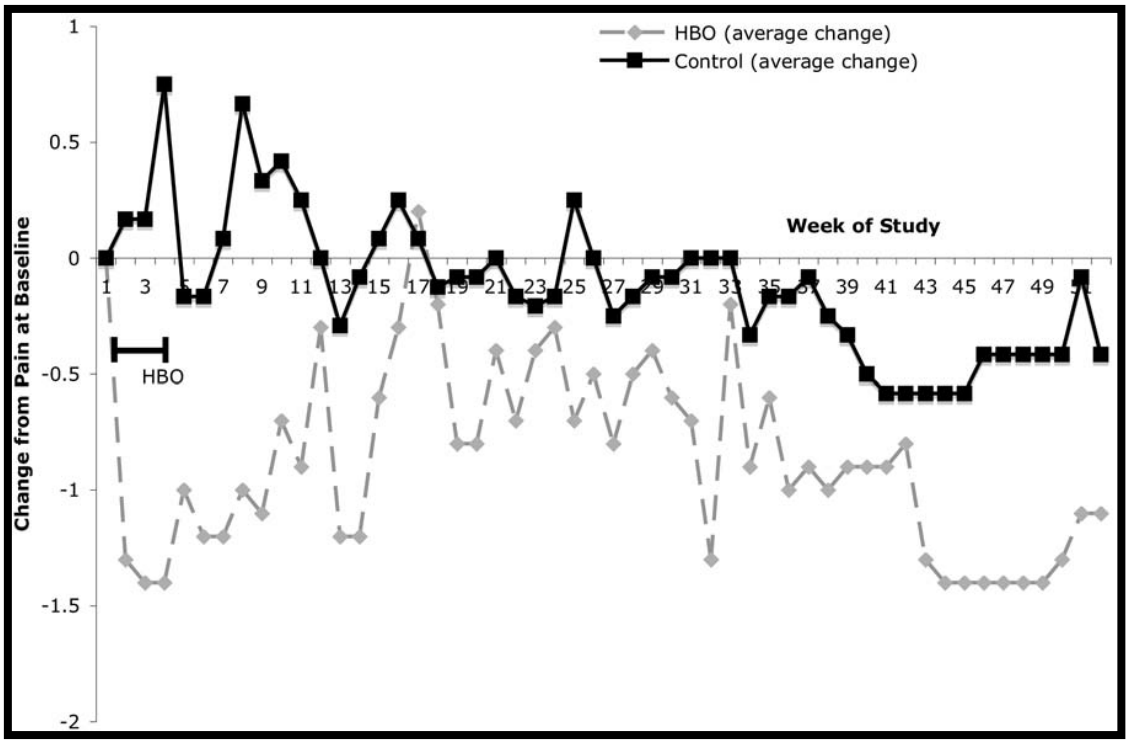


Randomized Controlled Trials of HBO for BRONJ

1. Under evaluation by a prospective randomized controlled trial of 70 patients at Duke University
2. Exclusion criteria are ongoing BP therapy, smoking, previous radiotherapy to the jaw, and a life expectancy of less than 12 months
3. Randomized at consent to receive either 40 HBO sessions at 2.0 atm for 2 hours or conservative therapy for BRONJ.
4. Debridement will be encouraged, and antibiotics will be given to both groups as needed in consultation with their referring oral surgeon or oncologist.
5. Changes in lesion size and number will be analyzed to determine healing or improvement rates

Early Lessons Learned From Randomized Trials

1. Enrollment has not yet been sufficient to fully assess the efficacy of HBO in healing
2. Patients in both treatment groups have improved clinically, and our experience has led us to disagree with the assertion some have made that BRONJ patients "must and can live with exposed bone.
3. It is our experience that patients with BRONJ improve with careful management, cessation of BP administration, debridement of necrotic bone, and adjunctive HBO therapy
4. prescribe antibiotics immediately when any sign of infection is present
5. Significant oral bone exposure in BRONJ implies the presence of devitalized tissue that should not be expected to support regrowth of gingiva.
6. CT is more useful than panorex in determining the extent of hidden BRONJ lesions
7. long-term pain scores for the HBO group have been less than those for the



controls

Table 1. CHANGE IN LESION (SIZE AND NUMBER) BY TREATMENT GROUP

Variable	Control	HBO	All
No exposed bone	1 (3)* 1 (6) 1 (12)	1 (12), 2 (6)†	6
Less exposed bone	1 (12)‡, 1 (3)§, 1 (3)	1 (12)¶, 1 (6), 1 (6)	6
No change	1 (6), 3 (3)		4
More exposed bone		1 (6)¶	1
Total for all categories	10	7	17
Minor surgery	7	6	
Major surgery	1‡	1¶	
Mean follow-up (mo)	9.5 ± 6.6	10.2 ± 8.3	

Future Efforts

1. The Duke randomized controlled trial has provided the opportunity to search for potential biomarkers of susceptibility to BRONJ while evaluating the response of oxygen-sensitive signals of bone turnover to HBO.
2. A comparison of the baseline to post-HBO values in the BRONJ patients to those of the normal subjects is providing insight into the underlying mechanisms of this disease.
3. Peripheral blood monocytes are analyzed to measure known mediators of OC activation and regulation

題號	題目
1	下列關於骨質石化症(osteopetrosis)的敘述,何者正確? (A) 破骨細胞數量太少 (B) 造骨母細胞太多 (C) 破骨細胞功能受損 (D) 膠原結構不全
答案(C)	出處：Oral & Maxillofacial Pathology, Neville second ed. p.535 ~ p.537
題號	題目
2	下列何種措施對減輕頭頸部放射線治療後造成之放射線骨壞死是錯誤的?
	(A) 放射線治療後比治療前拔牙好 (B) 為持良好的口腔衛生 (C) 避免牙齒及顎骨外傷 (D) 接受高壓氧治療
答案(A)	出處：Oral & Maxillofacial Pathology, Neville second ed. p.261 ~ p.264