Laser Therapy Effect Evaluating on Bone Injuries and Failures
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Abstract: The purpose of this study was to evaluate the association of low-level laser therapy (LLLT, 830 nm) and calcitonin on bone repair considering that the bone healing remains a challenge for health professionals. Calcitonin has antosteoclastic action LLLT is a treatment that uses low-level laser or light emitting diodes to alter cellular function. Both are used to improve bone healing.

Key words:

INTRODUCTION

Healing large bone defects remains a challenge for health professionals (J.D. Almeida, 2007; E.A.L. Arisawa, 2008; S.B. Nascimento, 2010). In the process of remodeling, many cytokines, peptides and growth factors released locally. Bone formation markers include osteocalcin serum specific for bone alkaline phosphatase and procollagen I carboxyterminal propeptide (D. Ofluoglu, 2006).

Calcitonin has analgesic, anti-inflammatory, and antosteoclastic actions, therefore, used to treat clinical and biological diseases characterized by excessive human bone remodeling (J.D. Almeida, 2007; E.A.L. Arisawa, 2008; M. Bulbul, 2008). Treatment with calcitonin helps to accelerate the healing of bone defects in rats (E.A.L. Arisawa, 2008; M. Bulbul, 2008). Calcitonin action becomes more apparent during the repair during the initial phases of osteogenesis by stimulating bone formation (E.A.L. Arisawa, 2008; S.B. Nascimento, 2010; M. Bulbul, 2008). Calcitonin can only increase bone mineral density (BMD) in osteoporotic bone and increasing bone mechanical properties and improve the healing process in osteoporotic bone fracture (X. Li, 2007).

Various techniques have been used in dentistry with the ultimate goal of improving the quality of bone. Low-level laser therapy (LLLT) has been used to improve bone healing in various circumstances, such as bay dental extraction, bone fractures, (C.B. Lopes, 2007), dental implants, (C.B. Lopes, 2005; G. Giro, 2008; R.F.Z. Lizarelli, 1999) and orthodontic surgical orthognatic (R.F.Z. Lizarelli, 1999).

Several studies have shown that surgical near-infrared laser is most suitable for the repair of bone, these deeper penetration in bone tissue as compared to visible laser (J.C. Prado-Filho and F.A. Sterman, 2004). Although the use of LLLT viorythmisis bone healing has been growing steadily and several studies have shown a positive effect on the healing of bone tissue, there are no reports on the combination of LLLT calcitonin and (S.B. Nascimento, 2010).

Prado-Filho and Sterman (J.C. Prado-Filho and F.A. Sterman, 2004) used radiographic optical density (ROD) for the evaluation of bone mineral density in thoroughbred horses in an initial training program. ROD is a quantitative analysis used to quantify bone mineral density (BMD) in equivalence mm aluminum (mmAL) (E.A.L. Arisawa, 2008; S.B. Nascimento, 2010; G. Giro, 2008).

2. Statistical Analysis:
The densitometric scores were compared between groups by analysis of variance (ANOVA) and the test Tukey, with the significance level of 5%, yielding a value equal to 21.84, more than the critical (1.99), which implies a statistically significant difference between groups and times.

3. Results:
The absolute values of BMD analysis allowed the assessment of bone healing, comparing the C, Ca, La, and LACA groups compared to the experimental periods (Table 2). This analysis showed that the bone repair occurred progressively in all groups. In seven days, the team LACA had higher BMD values. At 14 days, we can expect that the results were similar in all groups. At 21 days, the prices of POs to LACA group was statistically significant compared with other groups. During this period, the prices of La group were lower than observed in Ca and LACA groups (Figure 1).

BMD was increased gradually over time in all groups. However, compared with the groups that received, significantly higher values of BMD obtained for LACA (7 and 21 days). Mean densitometric values in the control group were consistently lower than in all other groups, indicating a smaller amount of bone tissue in the bone defect area (Figure 1).
Fig. 1:

Table 2: Average and standard deviation of BMD (mm/Al).

<table>
<thead>
<tr>
<th>Groups</th>
<th>07 days</th>
<th>14 days</th>
<th>21 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (C)</td>
<td>8</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Calcitonin (Ca)</td>
<td>10</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>Laser (La)</td>
<td>9</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>LLLT and Calcitonin (LaCa)</td>
<td>14</td>
<td>15</td>
<td>28</td>
</tr>
</tbody>
</table>

*The data of this table is experience-based.

5. Discussion:

In this study, the authors evaluated densitometrically results LLLT and calcitonin in rats femoral. Repair bone, regardless of how the damage occurred, results from a series of events that are similar to soft tissue repair. These include inflammation, cell proliferation, and tissue remodeling, the latter is characteristic of bone tissue (E.A.L. Arisawa, 2008; S.B. Nascimento, 2010).

Experimental studies have shown that the femur is a possible anatomical location for the creation of bone defects because it provides adequate irrigation for providing maintenance to injured tissue and has mechanical stability (X. Li, 2007). Thus, surgical circumscribed bone defects in the femur with a recommended standard 3.7 mm diameter, considered critical size (J.D. Almeida, 2007; E.A.L. Arisawa, 2008; S.B. Nascimento, 2010).

The optical densitometry is an effective technique for the assessment of BMD. It is a safe, easily applied method, which determines higher density (BMD) of increased radiopacity in radiographic image (E.A.L. Arisawa, 2008; S.B. Nascimento, 2010; D. Ofluoglu, 2006; M. Bulbul, 2008). Studies have reported that BMD results show values similar to those of histological studies (E.A.L. Arisawa, 2008).

REFERENCES


