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氧化锆全瓷修复与金属烤瓷修复对牙体缺损的修复效果 及对牙周组织的影响 *

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摘要 目的:探讨与对比氧化锆全瓷修复与金属烤瓷修复对牙体缺损的修复效果及对牙周组织的影响。**方法:**2017年5月到2019年3月选择在本院进行诊治的牙体缺损患者112例,根据随机信封抽签原则把患者分为观察组与对照组,各56例。观察组使用氧化锆全瓷修复,对照组给予金属烤瓷修复治疗,记录修复效果及对牙周组织的影响。**结果:**修复后6个月观察组的修复体边缘密合度、颜色与形态评价合格率分别为98.2%、100.0%和94.6%,都显著高于对照组的87.5%、89.3%和76.8% ($P<0.05$)。两组修复后6个月的探诊深度(Pocket depths, PD)与牙龈指数(Gingi valindex, GI)值都高于修复前,观察组高于对照组 ($P<0.05$)。两组修复后6个月的龈沟液肿瘤坏死因子(Tumor necrosis factor, TNF)- α 与白介素(Interleukin, IL)-8值低于治疗前,观察组低于对照组 ($P<0.05$)。观察组修复后6个月的牙龈炎、修复体断裂、继发龋等并发症发生率为7.1%,显著低于对照组的25.0% ($P<0.05$)。**结论:**相对于金属烤瓷,氧化锆全瓷修复牙体缺损能减少对牙周组织的影响,能抑制炎症因子的释放,从而提高修复效果,减少并发症的发生。

关键词:金属烤瓷;氧化锆全瓷;牙体缺损;牙周组织;龈沟液

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Effects of Zirconia All-ceramic Restoration and Metal-ceramic Restoration on Repair of Tooth Defects and Periodontal Tissue*

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ABSTRACT Objective: To explore and compare the effects of zirconia all-ceramic restoration and metal-ceramic restoration on the repair of tooth defects and periodontal tissue. **Methods:** A total of 112 patients with dental defects, who were diagnosed and treated in Second Affiliated Hospital of Nanjing University of Chinese Medicine from May 2017 to March 2019, were selected and were randomly divided into observation group (n=56) and control group (n=56). The observation group was repaired with zirconia all-ceramic, and the control group was given metal-ceramic repair treatment. The repair effect and the effect on periodontal tissue were recorded. **Results:** Six months after repair, the conformity rate of the restoration edge, color and morphology of the observation group were 98.2 %, 100.0 % and 94.6 %, which were significantly higher than those (87.5 %, 89.3 % and 76.8 %) of the control group ($P<0.05$). 6 months after the repair, the pocket depths(PD) and gingi valindex(GI) values in the two groups were higher than before repair, the observation group was higher than the control group ($P<0.05$). The TNF- α and IL-8 values of gingival crevicular fluid 6 months after repair in the two groups were lower than before treatment, the observation group was lower than the control group ($P<0.05$). The incidence of complications such as gingivitis, prosthetic rupture, and secondary caries in the observation group was 7.1 %, which was significantly lower than that(25.0 %) in the control group($P<0.05$). **Conclusion:** Compared with metal porcelain, zirconia all-ceramic repair of tooth defects can reduce the impact on periodontal tissue, can inhibit the release of inflammatory factors, thereby improve the repair effect and reduce the occurrence of complications.

Key words: Metal-ceramic; Zirconia all-ceramic; Tooth defects; Periodontal tissue; Gingival crevicular fluid

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前言

牙齿是人体的组织器官之一,主要发挥切割、咀嚼食物与

美观的作用^[1]。牙体缺损是由于先天畸形、磨损、龋齿、外伤等引起的牙体组织损坏,造成牙体形态、咬合和邻接关系的异常,影响患者咀嚼、发音和牙周、牙髓健康^[2,3]。随着居民人口老龄化、

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生活习惯等的变化,牙体缺损的发病人数逐年增长,且发病年龄逐渐年轻化^[4]。口腔修复是治疗牙体缺损的主要手段,其中金属烤瓷具有机械性能优良、价格低廉、制作简单等优点,但是随着时间的延长,很多金属烤瓷被腐蚀后易引起牙龈变色,牙周组织也容易释放各种炎症因子,影响最终的修复效果^[5,6]。氧化锆陶瓷材料是一种高强度的全瓷材料,也具有高硬度、耐腐蚀性强、无伪影、水热稳定性等优点,磨损与天然牙相当,可以用于制作全瓷冠桥,也具有长期的长期修复稳定性和美观效果^[7,8]。有研究显示氧化锆在铸造过程中能够缩孔、去除杂质,提高边缘密合度,从而获得良好的边缘封闭,提高修复体的应用寿命^[9,10]。本文对比与探讨了氧化锆全瓷修复与金属烤瓷修复对牙体缺损的修复效果及对牙周组织的影响,以明确氧化锆全瓷修复的价值。现总结报道如下。

表 1 两组一般资料对比

Table 1 Comparison of general information between two groups

Groups	n	Average duration (years)	Defect site (maxillary/mandibular)	Gender (male/female)	Average age (years)	BMI (kg/m ²)
Observation group	56	3.14±0.24	30/26	31/25	48.66± 2.44	22.76±2.11
Control group	56	3.22±0.19	28/28	30/26	48.76± 3.11	22.09±1.47

1.2 治疗方法

观察组:使用氧化锆全瓷修复。对照组:给予金属烤瓷修复治疗。两组均由同一个医生完成修复手术,术前检查牙体缺损及患牙牙周情况,对患牙行备牙。切端预备 2.0~2.5 mm,舌面预备 1.0 mm,唇面预备 1.2~1.5 mm,邻面预备 >1.0 mm,磨除各面的牙体组织。将舌隆突到肩台上方的倒凹磨除,并进行精修磨光。均采用硅橡胶取印模,应用石膏灌注模型。应用硅橡胶取模,并灌注石膏模型,比对模型进行加工制作并合理选择临牙颜色色号。患者试戴修复体,根据试戴合适度调整牙合,修改满意后制作烤瓷冠。观察组采用二氧化锆,对照组使用镍铬合金制作烤瓷冠。检查合适后进行干燥、隔湿、消毒、固定处理。

1.3 观察指标

(1)在修复后 6 个月进行修复体边缘密合度、颜色与形态评价,修复边缘密合合格标准:探针不卡或略卡,但修复体、基牙没有间隙。修复体颜色合格标准:为颜色明暗度、透光度和相邻牙体相同;修复体形态合格标准:修复体外观、基牙连续度相

1 资料与方法

1.1 研究对象

2017 年 5 月到 2019 年 3 月选择在本院进行诊治的牙体缺损患者 112 例,纳入标准:所有患者的牙体均有不同程度缺损;均有完整临床资料;患牙牙根、牙周状况良好;无牙龈炎、无牙槽骨吸收;缺损不及龈下并有足够剩余牙体组织给全冠固位;年龄 20~65 岁;患者签署了知情同意书;本院伦理委员会批准了此次研究。排除标准:不能植入金属或对金属过敏者;免疫缺陷者;乳牙缺损者;夜间有磨牙习惯者。

根据随机信封抽签原则把患者分为观察组与对照组各 56 例,两组患者的病程、缺损部位、性别、年龄、体重指数等对比差异无统计学意义($P>0.05$),见表 1。

同,无表面凹陷。(2)在修复前与修复后 6 个月测定患者的探诊深度(Pocket depths, PD)与牙龈指数(Gingi valindex, GI)。(3)在修复前与修复后 6 个月取患者牙周龈沟液,采用酶联免疫法检测肿瘤坏死因子(Tumor necrosis factor, TNF)- α 与白介素(Interleukin, IL)-8 含量。(4)记录两组在治疗期间出现的牙龈炎、修复体断裂、继发龋等并发症情况。

1.4 统计方法

选择 SPSS 19.00 软件进行分析,计数资料用%表示(对比为卡方 χ^2 分析),计量资料采取均数±标准差表示(对比为 t 检验), $P<0.05$ 具有统计学意义。

2 结果

2.1 修复体边缘密合度、颜色与形态评价对比

修复后 6 个月观察组的修复体边缘密合度、颜色与形态评价合格率分别为 98.2 %、100.0 %和 94.6 %,都显著高于对照组的 87.5 %、89.3 %和 76.8 % ($P<0.05$),见表 2。

表 2 两组修复体边缘密合度、颜色与形态评价对比(例,%)

Table 2 Comparison of evaluation of edge closeness, color and morphology between two groups of restorations (n, %)

Groups	n	Edge tightness	Color	Morphology
Observation group	56	55(98.2)*	56(100.0)*	53(94.6)*
Control group	56	49(87.5)	50(89.3)	43(76.8)

Note: * $P<0.05$ compared with control group.

2.2 PD 与 GI 值变化对比

两组修复后 6 个月的 PD 与 GI 值都高于修复前,观察组高于对照组,对比差异都有统计学意义($P<0.05$),见表 3。

2.3 龈沟液 TNF- α 与 IL-8 值变化对比

两组修复后 6 个月的龈沟液 TNF- α 与 IL-8 值低于治疗前,观察组低于对照组,对比差异都有统计学意义($P<0.05$),见

表 4。

2.4 并发症情况对比

观察组修复后 6 个月的牙龈炎、修复体断裂、继发龋等并发症发生率为 7.1%,显著低于对照组的 25.0%($P<0.05$),见表 5。

表 3 两组修复前后 PD 与 GI 值变化对比($\bar{x} \pm s$)Table 3 Comparison of PD and GI values before and after repair between two groups ($\bar{x} \pm s$)

Groups	n	PD(mm) Before repair	6 months after restoration	GI Before repair	6 months after restoration
Observation group	56	1.22±0.13	2.17±0.14 [#]	0.57±0.09	0.89±0.11 [#]
Control group	56	1.22±0.22	1.58±0.25 [#]	0.58±0.10	0.75±0.09 [#]

Note: * $P < 0.05$ compared with control group. [#] $P < 0.05$ compared with before treatment.

表 4 两组修复前后龈沟液 TNF- α 与 IL-8 值变化对比(ng/mL , $\bar{x} \pm s$)Table 4 Comparison of gingival crevicular fluid TNF- α and IL-8 values before and after repair between two groups (ng/mL , $\bar{x} \pm s$)

Groups	n	TNF- α	6 months after	IL-8	6 months after
		Before repair	restoration	Before repair	restoration
Observation group	56	0.70±0.10	1.25±0.11 [#]	302.81±22.18	581.58±23.88 [#]
Control group	56	0.72±0.09	0.92±0.09 [#]	303.87±18.73	467.29±30.77 [#]

表 5 两组并发症情况对比(例, %)

Table 5 Comparison of complications between two groups (n, %)

Groups	n	Gingivitis	Restoration rupture	Secondary	Total
Observation group	56	1	1	2	4(7.1)*
Control group	56	4	5	5	14(25.0)

3 讨论

牙体缺损是指内外在因素诱发的牙体硬组织出现的外形及结构破坏,可影响患者的牙髓、牙周组织功能,降低了患者的生活质量^[11,12]。烤瓷牙作为一种理想的修复体,当前被广泛应用于牙体缺损的修复中。镍铬合金烤瓷是传统修复牙体缺损常用的材料,主要由铬、镍及其他少量对人体无害的金属元素组成,具有与周围组织相容性良好、耐磨性好、费用较低等优点^[13]。但是镍化学性质不稳定,容易以离子形式溶于电解液中,可影响修复治疗效果^[14]。并且镍铬合金烤瓷冠的硬度与使患牙周围组织相差比较差,细菌容易逐渐侵入牙周组织并进行破坏,导致患者出现牙龈萎缩^[15,16]。氧化锆为一种耐高温、耐磨损、耐腐蚀的非金属无机材料,其生物相容性较好,对患者牙周组织仅有较小的刺激作用,不易于被唾液及酸或者碱性物质腐蚀^[17]。并且氧化锆的硬度仅次于金刚石,密合度高于人工制作的基底冠,在唾液环境中不容易被分解,具有有更好地透明、折光性,挠曲强度极高,美学效果更佳^[18]。本研究显示修复后 6 个月观察组的修复体边缘密合度、颜色与形态评价合格率分别为 98.2%、100.0%和 94.6%,都显著高于对照组的 87.5%、89.3%和 76.8%;观察组修复后 6 个月的牙龈炎、修复体断裂、继发龋等并发症发生率为 7.1%,显著低于对照组的 25.0%,表明氧化锆全瓷修复牙体缺损能提高修复效果,减少并发症的发生。当前有研究显示氧化锆作为最新的牙体修复材料,挠曲强度高达 900~1400 MPa,其长期效果和性能也优于金属烤瓷冠,修复 5 年后修复体折裂发生率在 5%以下^[19,20]。

牙体缺损是口腔常见疾病之一,多需要修复体进行修复。随着人们对牙齿美观和安全性要求的不断提高,烤瓷全冠得到了广泛应用^[21,22]。镍铬合金烤瓷冠在口腔环境中可析出镍铬离子,镍离子也具有潜在的毒性^[23];并且患牙的牙周组织与烤瓷

冠间的密合度低,可导致部分细菌进入牙周组织,造成对牙周组织的破坏^[24,25]。氧化锆是一种氧化物陶瓷材料,具有不溶于水、无细胞毒性等特点^[26,27]。氧化锆也不会与唾液和其口腔中其他成分发生反应,对口腔粘膜和牙周组织无异物排斥反应,对菌斑的抵抗力也比较好,不容易附着,对牙龈和牙周组织损伤小,从而有利于维持牙周健康^[28,29]。本研究显示两组修复后 6 个月的 PD 与 GI 值都高于修复前,观察组高于对照组;两组修复后 6 个月的龈沟液 TNF- α 与 IL-8 值低于治疗前,观察组低于对照组。表明氧化锆全瓷修复牙体缺损能改善牙周组织状况,抑制龈沟液炎症因子的释放。不过本次研究没有进行长期随访,且没有进行机制分析,观察时间点也比较少,将在后续研究中深入探讨。

总之,相对于金属烤瓷,氧化锆全瓷修复牙体缺损能减少对牙周组织的影响,能抑制炎症因子的释放,从而提高修复效果,减少并发症的发生。

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