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# 一次性根管治疗联合冠修复对隐裂性牙髓病患者的效果及对咀嚼功能的影响\*

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**摘要 目的:**探讨对隐裂性牙髓病应用一次性根管治疗联合冠修复治疗的效果及对咀嚼功能的影响。**方法:**选取我院2018年1月至2023年1月收治的80例隐裂性牙髓病患者,分为观察组与对照组,每组40例。对照组患者多次根管治疗后进行冠修复,观察组患者一次性根管治疗后进行冠修复。治疗3个月后对比两组患者临床疗效,记录治疗成功率,对比治疗前及治疗3个月后两组患者的咀嚼功能、疼痛程度、龈沟液炎症因子及碱性磷酸酶(ALP)表达水平,最后对比其菌斑指数(PLI),出血指数(BI)、探诊深度(PD)相关牙周健康指标变化。**结果:**观察组总有效率、治疗成功率明显高于对照组( $P<0.05$ );治疗后两组患者咀嚼功能评分升高,观察组高于对照组,疼痛程度评分降低,观察组低于对照组( $P<0.05$ );治疗后两组患者PD、BI、PLI水平降低,观察组低于对照组( $P<0.05$ );治疗后两组患者龈沟液IL-6、CRP、TNF- $\alpha$ 、ALP水平降低,观察组低于对照组( $P<0.05$ )。**结论:**对隐裂性牙髓病应用一次性根管治疗联合冠修复治疗具有较为显著的效果,且可提升远期治疗成功率,提升咀嚼功能,减轻牙周疼痛程度,降低牙周炎症反应,减轻疾病严重程度,改善牙周健康水平。

**关键词:**一次性根管治疗;冠修复;隐裂性牙髓病;咀嚼功能

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## The Effect of One-time Root Canal Therapy Combined with Crown Restoration on Patients with Cryptorchidism and Its Impact on Chewing Function\*

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**ABSTRACT Objective:** To explore the effect of disposable endodontic treatment combined with crown repair and its effect on chewing function. **Methods:** 80 patients with cryptic cleft dental pulp disease admitted to our hospital from January 2018 to January 2023 were selected and divided into observation group and Matched group, with 40 patients in each group. The Matched group patients underwent crown restoration after multiple root canal treatments, while the observation group patients underwent crown restoration after a single root canal treatment. After 3 months of treatment, the clinical efficacy of the two groups of patients was compared, and record all patients treatment success rates. The chewing function, pain level, inflammatory factors in gingival crevicular fluid, and expression levels of alkaline phosphatase (ALP) were compared between the two groups of patients before and after 3 months of treatment. Finally, their plaque index (PLI) was compared, Changes in periodontal health indicators related to bleeding index (BI) and probing depth of gingival sulcus (PD). **Results:** The total effective rate and treatment success rate of the observation group were higher than those of the matched group ( $P<0.05$ ); Post-treatment, the chewing function score of the two groups of patients increased, and the observation group was higher than the matched group. The pain level score decreased, and the observation group was lower than the matched group ( $P<0.05$ ); Post-treatment, the levels of PD, BI, and PLI in both groups of patients decreased, and the observation group was lower than the matched group ( $P<0.05$ ); Post-treatment, the two patients had lower levels of IL-6, CRP, TNF- $\alpha$ , and ALP, while the observation group was lower than the matched group ( $P<0.05$ ). **Conclusion:** The combination of one-time root canal therapy and crown restoration has a significant therapeutic effect on cracked pulp disease, and can improve the long-term success rate of treatment, enhance chewing function, alleviate periodontal pain, reduce periodontal inflammation, alleviate disease severity, and improve periodontal health.

**Key words:** Disposable root canal treatment; Coronary restoration; Cleft pulp disease; Chewing function

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## 前言

牙隐裂为由相关因素长期作用导致未经治疗的牙齿表面出现细微裂纹,长期发展后深入牙髓,发生牙髓病,称为隐裂性牙髓病,为牙髓病的特殊类型<sup>[1]</sup>。隐裂性牙髓炎虽然早期并无显著症状,但发生后若不及时干预,耽误最佳治疗时期,牙裂纹会逐渐达到牙本质深层,不仅加重牙髓感染,还会出现严重的疼痛症状,影响咬合及咀嚼功能,降低患者生活质量<sup>[3,4]</sup>。另外,随着隐裂性牙髓炎发展,还容易促使患者出现牙齿折裂情况,导致牙齿缺失,影响饮食与患者牙齿外观。所以,隐裂性牙髓炎发生之后需要在短时间内采取相关治疗,进行根管治疗的同时采取冠修复措施,可保留患牙的同时,减轻患者疼痛症状,提升咀嚼功能。以往临床上对于牙髓病多采取多次根管治疗后行冠修复,随着可改善患者牙龈肿胀及牙髓炎症反应,减轻疼痛程度,但治疗时间较长,增加患者痛苦的同时,也会由于长期治疗导致细菌在牙髓内留存,增加再次发病率<sup>[5]</sup>。研究显示<sup>[6,7]</sup>,对于牙髓病患者可利用一次性根管治疗联合冠修复,减少患者多次复诊带来的不便,但针对隐裂性牙髓病患者采取一次性根管治疗联合冠修复对于咀嚼功能的改善情况及总体效果尚无明确定论。因此,本研究对隐裂性牙髓病应用一次性根管治疗联合冠修复,分析其效果。

## 1 资料与方法

### 1.1 一般资料

选取 2018 年 1 月至 2023 年 1 月收治的 80 例隐裂性牙髓病患者,分为观察组与对照组,各 40 例。经我院伦理委员会批准。对照组男 24 例,女 16 例;平均年龄(43.25± 5.27)岁;平均患牙数(1.36± 0.21)颗。对照男 22 例,女 18 例;平均年龄(43.57± 5.26)岁;平均患牙数(1.43± 0.12)颗。两组患者一般资料对比无差异( $P>0.05$ )。

### 1.2 纳排标准

纳入标准:符合隐裂性牙髓病诊断标准<sup>[8]</sup>;无明显牙周病变,且未经牙髓治疗;通过 X 线片诊断可显示根尖阴影情况;年龄为 18 岁以上;对本研究知情同意。

排除标准:根管治疗或冠修复治疗失败者;已经出现牙齿折裂情况无法进行修复者;牙周状况较差或牙周严重感染者;合并下颌关节紊乱或感染者;合并严重心脑血管疾病者;根管重度弯曲者。

### 1.3 方法

对照组:多次根管治疗,并行冠修复:第 1 次治疗,浸润麻醉后开髓,并将慢性失活剂注入髓内,完成后应用 Caviton 暂封,处理完毕,嘱咐患者 7 d 后复诊。第 2 次,去除暂封材料后对患者根管长度进行测量,利用 Waveone 实行根管预备,随后采用 EDTA 凝胶进行润滑处理,并应用 NaClO 反复对根管内进行冲洗,采取 ApexCal 进行根管消毒,并放置在根管内部,随后暂封处理,7 d 后进行第 3 次治疗。7 d 后首先采用 X 线对患牙进行诊断,观察患者患牙情况,并对主尖进行示踪,填充根管,牙体预备并制作临时冠。7 d 后对患者采取冠修复。

观察组:一次性根管治疗,并行冠修复:浸润麻醉后开髓,在髓内注入慢性失活剂,对患者根管长度进行测量,利用

Waveone 实行根管预备,随后采用 EDTA 凝胶进行润滑处理,并应用 NaClO 反复对根管内进行冲洗,采取 ApexCal 进行根管消毒,并放置在根管内部,采用 X 线对患牙进行诊断,观察患者患牙情况,并对主尖进行示踪,填充根管,牙体预备并制作临时冠。7 d 后对患者采取冠修复。

治疗期间嘱咐患者禁止使用患牙进行咀嚼,并指导患者进行口腔卫生清洁。

### 1.4 观察指标与疗效判定标准

1.4.1 观察指标 (1)分析咀嚼功能、疼痛程度。咀嚼功能判定:将 3 g 干燥花生给予患者,使其咀嚼至吞咽时吐出,记录咀嚼次数、时间,整个过程重复 3 次,将食物残渣洗涤、干燥并振荡,在 10 min 后,观察并记录塞孔通过食物数量,并计算通过食物数量占所有食物数量比重,从而进行评分,分数与咀嚼功能呈正比。疼痛程度判定标准:采用标准积极性疼痛分级法(MohdSulong)分级标准评价,3 分为疼痛症状严重,且牙周出现肿胀情况;2 分为疼痛症状显著,但口服止痛药物后可以缓解;1 分为轻微牙痛;0 分为无牙痛<sup>[9]</sup>。

(2)分别在治疗前与治疗 3 个月后复诊抽取患者龈沟液样本,将牙菌斑去除后进行离心处理,取上层清液应用酶联免疫吸附法检测龈沟液白细胞介素-6(IL-6)、C 反应蛋白(CRP)、肿瘤坏死因子- $\alpha$ (TNF- $\alpha$ )、碱性磷酸酶(ALP)表达水平。

(3)分别在治疗前及治疗 3 个月后记录两组患者牙周健康指标变化,其中包括菌斑指数(PLI),出血指数(BI)、探诊深度(PD)。

1.4.2 疗效判定标准 显效:具有正常的咀嚼功能,牙髓炎症完全消失;有效:具有基本正常的咀嚼功能,为发现明显冷热刺激痛,仅有轻微不适感;无效:具有较为明显的咬合痛,并咀嚼功能丧失,牙龈红肿反复出现,严重者引发牙周溢脓。总有效率=(显效+有效)/总人数 $\times$ 100%。治疗成功判定标准:X 线片表示根尖周并无明显改变与根裂,全冠边缘密合,咀嚼功能正常,牙周正常,无临床体征及自觉症状为治疗成功。X 线片表示根尖周出现根裂或低密度影,全冠边缘密合度欠佳,咀嚼功能丧失,牙周反复肿胀,咬合明显不适,患牙松动为治疗失败<sup>[10]</sup>。

### 1.5 统计学方法

采取 SPSS 23.0 分析,计数资料以(n%)表示, $\chi^2$  检验;计量资料用( $\bar{x}\pm s$ )表示,t 检验;以  $P<0.05$  为差异有统计学意义。

## 2 结果

### 2.1 临床疗效与治疗成功率对比

观察组与对照组相比,具有较高的总有效率、治疗成功率( $P<0.05$ ),见表 1。

### 2.2 咀嚼功能与疼痛程度对比

治疗后两组患者咀嚼功能评分升高,疼痛程度评分降低,观察组与对照组对比具有相同趋势( $P<0.05$ ),见表 2。

### 2.3 牙周健康水平对比

在治疗后患者 PD、BI、PLI 水平降低,观察组与对照组比较有差异( $P<0.05$ ),见表 3。

### 2.4 龈沟液炎症因子及碱性磷酸酶水平对比

治疗后两组患者龈沟液 IL-6、CRP、TNF- $\alpha$ 、ALP 水平降低,观察组低于对照组( $P<0.05$ ),见表 4。

表 1 临床疗效与治疗成功率对比(n,%)

Table 1 Comparison of clinical efficacy and treatment success rate(n, %)

Groups	n	Effectiveness				Treatment Success Rate
		Effectiveness	Effective	Invalid	Total effective rate	
Observation group	40	13(32.50)	25(62.50)	2(5.00)	38(95.00)	36(90.00)
Matched group	40	10(25.00)	20(50.00)	10(25.00)	30(75.00)	29(72.50)
$\chi^2$	-	-	-	-	6.275	4.020
$P$	-	-	-	-	0.012	0.045

表 2 咀嚼功能与疼痛程度对比( $\bar{x} \pm s$ ,分)

Table 2 Comparison of Chewing Function and Pain Level ( $\bar{x} \pm s$ , points)

Groups	n	Masticatory function		Pain level	
		Pretherapy	Post-treatment	Pretherapy	Post-treatment
Observation group	40	56.92± 8.36	83.43± 11.68*	2.38± 0.35	1.02± 0.18*
Matched group	40	56.10± 8.23	72.42± 10.44*	2.36± 0.22	1.34± 0.31*
$t$	-	0.442	4.445	0.306	5.646
$P$	-	0.660	<0.001	0.760	<0.001

Note: compared with Pretherapy, \* $P < 0.05$ , the same below.

表 3 牙周健康水平对比( $\bar{x} \pm s$ )

Table 3 Comparison of periodontal health levels( $\bar{x} \pm s$ )

Groups	n	PD(mm)		BI		PLI	
		Pretherapy	Post-treatment	Pretherapy	Post-treatment	Pretherapy	Post-treatment
Observation group	60	6.18± 1.83	2.86± 0.44*	1.75± 0.14	1.20± 0.11*	1.95± 0.33	1.21± 0.28*
Matched group	60	6.18± 1.86	3.88± 0.38*	1.73± 0.16	1.43± 0.14*	1.92± 0.25	1.44± 0.27*
$t$	-	0.256	11.096	0.595	8.170	0.458	3.740
$P$	-	0.799	<0.001	0.554	<0.001	0.648	<0.001

表 4 龈沟液炎症因子及碱性磷酸酶水平对比( $\bar{x} \pm s$ )

Table 4 Comparison of inflammatory factors and alkaline phosphatase levels in gingival crevicular fluid( $\bar{x} \pm s$ )

Groups	n	IL-6(pg/L)		CRP(mg/L)		TNF- $\alpha$ ( $\mu$ g/L)		ALP content( $\mu$ U)	
		Pretherapy	Post-treatment	Pretherapy	Post-treatment	Pretherapy	Post-treatment	Pretherapy	Post-treatment
Observation group	40	103.68± 13.26	71.34± 2.67*	34.45± 5.25	20.35± 4.04*	8.46± 1.53	4.65± 1.24*	422.92± 38.36	243.43± 11.68*
Matched group	40	104.23± 13.35	89.62± 3.24*	34.43± 4.36	26.62± 3.16*	8.36± 1.47	5.26± 1.37*	420.10± 41.23	276.42± 10.44*
$t$	-	0.185	27.537	0.019	7.731	0.298	2.088	0.317	13.319
$P$	-	0.854	<0.001	0.985	<0.001	0.766	0.040	0.752	<0.001

### 3 讨论

牙髓病作为牙科中常见疾病,其发生率较高,同时可能会引发患者出现牙本质出血、空洞、断裂等症状,进而导致牙周出现明显的疼痛感及溃烂,为患者带来极大不适<sup>[1]</sup>。隐裂性牙髓病作为牙髓病中的一种,随着疾病进展,患者会逐渐出现牙齿咬合疼痛症状,同时对于温度的刺激较为敏感,影响患者进食咀嚼过程。另外研究表明,通过根管治疗可减轻牙髓疼痛情况,

其为牙周、牙髓疾病的重要治疗方式,创伤小,且效果显著。但是通过根管治疗后牙髓失去活性,可减轻患者疼痛情况,但患牙也会出现缺失,影响咀嚼功能,也影响牙齿的美观度<sup>[12][13]</sup>。全瓷冠作为一种覆盖在全部牙冠表面的治疗方式,其具有美观性好、硬度高等优势,同时内部不需要金属材料,可避免出现崩瓷现象,修复后患者牙龈边缘的表现也较为自然<sup>[14]</sup>。因此,根管治疗联合冠修复成为牙髓病治疗的重要措施。然而,当前临床上针对根管治疗是采取一次性还是多次治疗尚存在一定争议,因

此本研究对我院隐裂性牙髓病患者分别采取一次性和多次根管治疗联合冠修复,以期临床提供参考意见<sup>[15]</sup>。

本研究结果表明,一次性根管治疗联合冠修复可提升远期疗效,与 Mergoni G 等<sup>[16]</sup>研究具有一致性。他们的结果显示,牙髓炎患者采取一次性根管治疗成功率更高。分析原因为,一次性根管治疗不仅治疗方便,得到患者高度认可,而且可通过填充之前的清理与填充过程中不断结合 X 线片确认位置,可在一次性完成对于隐裂性牙髓炎的治疗,减少病灶开放次数,减轻患者疼痛感的同时,降低感染发生率,提升近远期疗效<sup>[17-19]</sup>;观察组与对照组相比,咀嚼功能评分较高,疼痛程度评分较低( $P<0.05$ )。据报道<sup>[20]</sup>,对咀嚼功能、牙周疼痛程度进行改善是牙髓病治疗的重要目的之一,通过科学的修复治疗,提升患者牙齿完整度,降低疼痛程度,进一步提升患者生活质量。Alghamdi F 等<sup>[21]</sup>研究显示,多次根管治疗可避免一次时间过久操作,减轻患者治疗过程中不适感,可多次彻底清除根管内感染物,与本研究结果具有一定差异。我们认为,采取一次性根管治疗不仅治疗周期短、效率高,而且可避免多次根管治疗进行的多次消毒处理、根管预备和拔髓治疗,避免患者多次复诊的同时,可预防长期治疗出现髓内感染的可能,减轻患者远期疼痛情况,进一步提升其咀嚼功能<sup>[22-24]</sup>。但一次性完成对于手术范围、根管长度具有更严格的要求,而本研究由于数据样本量过少,还存在一定局限,还需持续进行深入研究;患者在治疗后 PD、BI、PLI 表达量降低,观察组低于对照组( $P<0.05$ ),与 Casaña Ruiz MD 等<sup>[25]</sup>研究结果相符。分析原因为,分期进行根管治疗,虽然也可改善牙髓病的感染症状,但需要分期进行根管预备、成形等修复,最后利用糊剂来封闭根管,治疗过程中需要复诊 2~4 次,反复操作容刺激患者健康的牙体组织,增加患者牙齿不适感的同时,增加牙齿脆性,影响患者牙周健康水平<sup>[26]</sup>。IL-6、CRP、TNF- $\alpha$  为常见炎症反应因子,研究发现<sup>[27]</sup>,龈沟液相关炎症因子检测对判断口腔炎症反应程度敏感性更高;另外研究发现<sup>[28]</sup>,平均牙槽骨丧失量和牙周袋深度会影响龈沟液 ALP 活性。本研究显示,患者在治疗后龈沟液 IL-6、CRP、TNF- $\alpha$ 、ALP 表达量降低,观察组低于对照组( $P<0.05$ ),证明一次性根管治疗联合冠修复可减轻患者牙周炎症水平,改善疾病严重程度,与 Donnelly A 等<sup>[29]</sup>研究结果相符。分析原因为,一次性根管治疗依然可清除牙髓感染炎症,同时能够缓解感染对于根尖所产生的刺激,控制牙周炎症反应,减轻牙龈疼痛、脓肿、出血等症状,同时可改善龈沟液炎症因子水平,减轻疾病严重程度。另外有研究显示<sup>[30]</sup>,一次性根管治疗隐裂性牙髓病可缩短治疗疗程,无需进行调颌,降低牙齿劈开情况发生率,改善患者牙周炎症水平,与本研究结果相符。

综上,对隐裂性牙髓病应用一次性根管治疗联合冠修复治疗具有较为显著的效果,且可提升远期治疗成功率,提升咀嚼功能,减轻牙周疼痛程度,降低牙周炎症反应,减轻疾病严重程度,改善牙周健康水平。

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(上接第 2722 页)

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