Informed Consent Form

Dear Patient,

We sincerely invite you to participate in a clinical study titled "In Vivo Study on the Performance of iRoot SP and nRoot SP Root Canal Sealer Materials." This study is under the responsibility of Dr. Tu Yan, Chief Physician of the Department of Cariology and Endodontics. It plans to recruit 80 participants and has been reviewed and approved by the Ethics Committee of the Affiliated Stomatology Hospital, School of Medicine, Zhejiang University.

Before you decide whether to participate, please read the following information carefully. It will help you understand this study, why it is being conducted, its procedures and duration, as well as the potential benefits, risks, and inconveniences your participation may entail. If anything is unclear or if you would like more information, please contact Dr. Tu Yan of the Department of Cariology and Endodontics at: (+86)15858224066.

The following provides a detailed introduction to this study:

I. Study Introduction

Study Background

Root canal treatment is a key therapeutic approach for pulp diseases and periapical diseases. The performance of the root canal sealer directly affects the long-term success rate of the treatment. In recent years, bioceramic-based sealers have become a research focus due to their excellent physicochemical properties and bioactivity. The imported iRoot SP(injectable root canal sealer paste), as a representative of calcium silicate-based bioceramic materials, has been widely used in clinical practice. The domestic new material nRoot SP(ENPUNUO root canal sealer paste) has entered the market in the past two years. nRoot SP exhibits high heat resistance, high flowability, high sealing ability, and high radiopacity. Its core components react within the root canal to form hydroxyapatite, inducing periapical bone regeneration. *In vitro* studies indicate its apical sealing ability is comparable to iRoot SP, and it can promote osteogenic differentiation of periodontal ligament stem cells and inhibit periapical bone resorption, suggesting potential clinical advantages. Nevertheless, there is still a lack of long-term clinical outcome data for domestic materials and direct comparative studies with imported products. Existing clinical trials often focus on short-term efficacy (e.g., postoperative pain) or single performance indicators, lacking long-term follow-up data for patients with complex root canal anatomy or chronic periapical periodontitis. Therefore, this study aims to conduct a randomized controlled clinical trial to evaluate the 3-24month efficacy (including reduction range of periapical radiolucency on radiographs, postoperative pain, etc.) of both materials in patients with chronic periapical periodontitis. The goal is to provide evidence-based data for the optimization and clinical selection of domestic materials and to promote the precise application of bioceramic sealers.

Study Objectives

1. To compare the therapeutic effects of the two materials in patients with chronic periapical periodontitis through a randomized controlled trial.
2. To provide objective data support for the clinical selection of root canal sealers, promote the optimization and application of domestic materials, and offer direction for the research and development and improvement of root canal sealers.

II. Specific Procedures and Process

If you agree to participate and meet the inclusion criteria, you will be enrolled in this study. This study employs an **interventional, single-center** design. The specific study process is as follows:

The start and end dates for this study are: from the date of ethical approval until June 30, 2028.

This project involves one center, the Affiliated Stomatology Hospital, School of Medicine, Zhejiang University, with a total recruitment target of 80 participants.

III. What You Need to Do if You Participate

1. Expected Duration of Participation

After you sign this informed consent form, we will proceed with the study according to the established protocol. Your expected duration of participation in the trial is 3 years.

2. Group Allocation Method and Probability

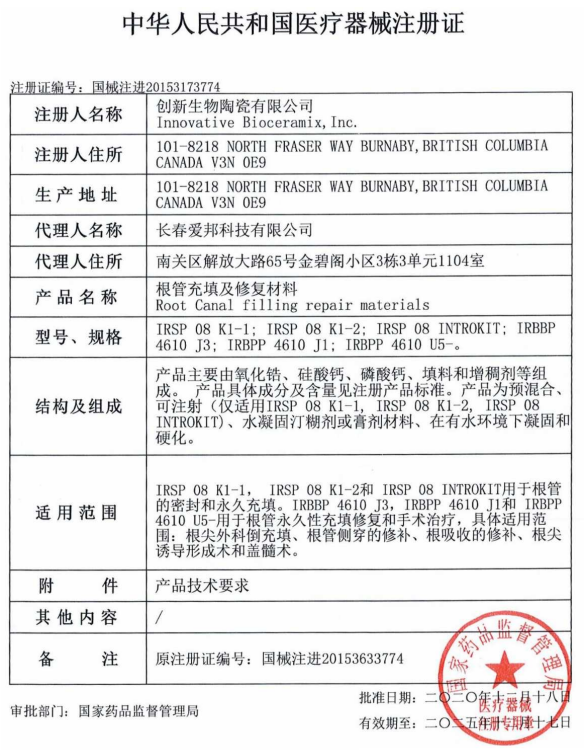
For eligible patients with periapical periodontitis, according to the established study protocol, successfully enrolled participants will be randomly assigned to either the iRoot SP group or the nRoot SP group using a simple randomization method. Your probability of being assigned to either group is equal.

3. Trial Procedures Participants Need to Follow and Obligations

For eligible patients with periapical periodontitis:

1) If you are assigned to the iRoot SP group, we will perform your root canal treatment using iRoot SP Bioceramic Root Canal Sealer Paste.

[Medical Device Registration Certificate Information for iRoot SP]



中华人民共和国医疗器械注册证

注册证编号：国械注进20153173774

注册人名称	创新生物陶瓷有限公司 Innovative Bioceramix, Inc.
注册人住所	101-8218 NORTH FRASER WAY BURNABY, BRITISH COLUMBIA CANADA V3N 0E9
生产地址	101-8218 NORTH FRASER WAY BURNABY, BRITISH COLUMBIA CANADA V3N 0E9
代理人名称	长春爱邦科技有限公司
代理人住所	南关区解放大路65号金碧阁小区3栋3单元1104室
产品名称	根管充填及修复材料 Root Canal filling repair materials
型号、规格	IRSP 08 K1-1; IRSP 08 K1-2; IRSP 08 INTROKIT; IRBBP 4610 J3; IRBPP 4610 J1; IRBPP 4610 U5-。
结构及组成	产品主要由氧化锆、硅酸钙、磷酸钙、填料和增稠剂等组成。 产品具体成分及含量见注册产品标准。产品为预混合、可注射（仅适用IRSP 08 K1-1, IRSP 08 K1-2, IRSP 08 INTROKIT）、水凝固汀糊剂或膏剂材料、在有水环境下凝固和硬化。
适用范围	IRSP 08 K1-1, IRSP 08 K1-2和 IRSP 08 INTROKIT用于根管的密封和永久充填。IRBBP 4610 J3, IRBPP 4610 J1和 IRBPP 4610 U5-用于根管永久性充填修复和手术治疗，具体适用范围：根尖外科倒充填、根管侧穿的修补、根吸收的修补、根尖诱导形成术和盖髓术。
附件	产品技术要求
其他内容	/
备注	原注册证编号：国械注进20153633774

审批部门：国家药品监督管理局

批准日期：二〇二〇年十一月十八日

有效期至：二〇二五年十一月十七日

[Instructions for Use and Precautions - iRoot SP]

* Before using iRoot SP, thoroughly prepare and irrigate the root canal according to routine root canal treatment procedures.
* Remove the iRoot SP syringe cap and screw on the root canal applicator tip clockwise. The applicator tip can be bent to any angle to facilitate filling root canals in any anatomical position.
* Insert the applicator tip as deeply as possible into the root canal. Gently and continuously inject iRoot SP towards the apex. Confirm apical seal via radiograph. If an insufficient amount is placed, thoroughly wash iRoot SP out of the canal and repeat the placement steps.
* Continue withdrawing the applicator tip while filling the canal. Fill the canal completely, avoiding void formation and overfilling.
* Remove excess iRoot SP from the canal orifice with a moist cotton pellet.
* Place gutta-percha points or use warm gutta-percha technique in the root canal using conventional obturation methods. iRoot SP is part of the permanent root canal filling.
* Remove the disposable applicator tip from the iRoot SP syringe by rotating counterclockwise. Replace the syringe cap tightly. Store the syringe sealed in foil at room temperature in a dry place.

2) If you are assigned to the nRoot SP group, we will perform your root canal treatment using nRoot SP Bioceramic Root Canal Sealer Paste.

[Medical Device Registration Certificate Information for nRoot SP]

中华人民共和国医疗器械注册证

注册证编号：国械注准20243170949

注册人名称	长沙恩普诺生物科技有限公司
注册人住所	长沙高新开发区谷苑路229号海凭园生产厂房三201
生产地址	长沙高新开发区谷苑路229号海凭园生产厂房三201
代理人名称	/
代理人住所	/
产品名称	根管充填糊剂
型号、规格	NR SP-0.5，NR SP-1，NR SP-2，NR SP-3，NR SP-5
结构及组成	产品由氧化锆、硅酸三钙与硅酸二钙、氢氧化钙和增稠剂组成，配件为牙科输送器（头）。
适用范围	与牙胶尖配合，用于根管的密封和充填。
附 件	产品技术要求
其他内容	无
备 注	

审批部门：国家药品监督管理局 医疗器械注册专用章

批准日期：二〇二四年五月十七日
生效日期：二〇二四年五月十七日
有效期至：二〇二九年五月十六日

[Instructions for Use and Precautions - nRoot SP]

* Before using nRoot SP, perform adequate root canal preparation and irrigation according to root canal treatment procedures.
* Unscrew the product syringe cap and tighten the root canal applicator tip. Express product into the tip to expel air.
* Insert the applicator tip as deeply as possible into the root canal. Gently and continuously inject nRoot SP towards the apex. Slowly withdraw the applicator tip while filling the canal. Fill the canal completely, avoiding void formation and overfilling.
* Check the filling via radiograph. If an insufficient amount is placed, thoroughly wash nRoot SP out of the canal and repeat the placement steps.
* Remove excess nRoot SP from the canal orifice with a moist cotton pellet.
* Gutta-percha points are typically placed in the root canal for synergistic use.
* Remove the disposable dental applicator (tip) from the syringe by rotating counterclockwise. Re-tighten the syringe cap. Store the syringe sealed in a foil bag at room temperature in a dry place.

3) Trial Procedures Participants Need to Follow (Treatment and Examination Steps):

We will assess the condition of your affected tooth through clinical examination (e.g., percussion pain, mobility, sinus tract, periodontal probing depth). We will analyze the range of periapical radiolucency of your affected tooth via radiographic examination.

4) Trial Procedures Participants Need to Follow (Data Collection and Detailed Follow-up Plan):

During the study, you will need to fulfill the following obligations:

During the treatment phase: You need to attend follow-up visits as scheduled by your doctor to complete the root canal treatment. If you require other treatments, please contact your doctor in advance.

During the follow-up phase: You need to attend follow-up visits at the times agreed upon with your doctor. The doctor may contact you via phone or home visit to understand your condition. Your follow-up data will provide reliable information for the research and serve as the basis for the doctor to judge the effectiveness of the treatment you received.

IV. Potential Benefits of Participating in This Study

By participating in this study, your chronic periapical periodontitis condition may improve, and associated pain may be alleviated. You will receive feedback on relevant clinical and radiographic examination results, gaining insight into your oral health status. We will also provide you with medical and health consultation.

Furthermore, your participation may contribute to future understanding of the development and impact of such diseases and their scientific treatment. The results of this study may help provide more suitable therapeutic interventions for you and other patients with similar conditions in the future, offering evidence-based support for clinical practice.

V. Potential Adverse Reactions, Risks, and Risk Prevention Measures

1. Potential Adverse Reactions and Risks

This study is interventional. Any treatment carries the potential for unknown adverse reactions. Based on clinical experience, this study involves root canal treatment, a procedure consistent with standard hospital root canal therapy, and does not pose additional risks to you. However, a small number of individuals may experience occlusal discomfort or mild dull pain within 1-2 weeks after root canal treatment, which usually resolves on its own. Very rarely, individuals may have an allergic reaction to the root canal sealer material, leading to an irritant response in the periapical tissues, manifested as local itching, swelling, or dull pain. This typically has a minor impact on patient health and rarely leads to long-term complications. Should this occur, we will immediately discontinue the use of the sealer and clean residual material from the root canal. The affected patient will undergo re-treatment and anti-allergy therapy, and the cause will be documented. Additionally, this study will collect case information via questionnaires. If any questions in the questionnaire make you uncomfortable, you may refuse to answer them.

2. Risk Prevention Measures

We will assess potential adverse reactions related to this study through physical and radiographic examinations. If you experience any discomfort or adverse reactions during the study, please contact us promptly, and we will provide you with active treatment.

3. Compensation and Treatment for Study-Related Injury

The risks you face in this study are not greater than the minimal risks encountered in daily life or during routine physical or psychological examinations/tests. Study-related injury is not anticipated.

VI. Cost Information

Participation in this study does not involve additional examinations or treatment items compared to routine clinical treatment. Both root canal sealer materials are used clinically in our hospital, with different procurement costs: iRoot SP material is 810 RMB per syringe (2g), and nRoot SP material is 539 RMB per syringe (2g). In this project, patients in the iRoot SP group will be charged a material fee of 15 RMB per tooth for iRoot SP, and patients in the nRoot SP group will be charged a material fee of 10 RMB per tooth for nRoot SP. Fees for other materials and procedures are consistent with standard clinical treatment costs.

VII. Compensation for Participation

This study falls within the scope of routine treatment. To compensate for potential expenses you may incur from multiple follow-up visits, such as transportation costs and loss of work time, this study will provide a subsidy of 200 RMB per participant.

VIII. Alternative Options

If, after careful consideration, you choose not to participate in this study, you will receive routine root canal treatment using iRoot SP. Of course, you retain the full right to receive other treatment options based on your physician's professional advice. Your final decision on

whether to participate will not affect your doctor's objective medical evaluation of your condition or their judgment regarding relevant treatment plans. Regardless of your participation, your medical treatment and rights will not be affected.

IX. Confidentiality of Your Personal Information

Your medical records (including study case report forms and examination reports) will be stored at the hospital in accordance with regulations. Individuals not involved in the research are not permitted to access your medical records without authorization. Without violating confidentiality principles and relevant regulations, monitors, auditors, the Ethics Committee, and regulatory authority inspectors may review your original medical records to verify the clinical trial process and data. Any public reports of this study's results will not disclose your personal identity. We will make every effort within legal and ethical bounds to protect the privacy of your personal medical information.

X. Withdrawal from the Study

You may withdraw from the trial at any time, at any stage during the research process, without discrimination or negative consequences. Your medical treatment and rights will not be affected. If new information arises that may affect your rights during the trial, we will inform you promptly, and you can decide whether to continue participating. Furthermore, we may terminate your participation in this study under the following circumstances:

1. You do not follow the study doctor's instructions or fail to attend scheduled follow-up visits over an extended period.
2. You experience a serious condition that may require treatment.
3. You develop other illnesses, such as genetic disorders or viral infections, making you unsuitable for this study, and the investigator deems it necessary to terminate your participation.

XI. Ethics Committee

This study has been reported to the Medical Ethics Committee of the Affiliated Stomatology Hospital, School of Medicine, Zhejiang University. It has undergone comprehensive review by the Committee, including assessment of risks to participants, and has received approval. During the study, **for any matters concerning ethics or rights, you may contact the Medical Ethics Committee of the Affiliated Stomatology Hospital, School of Medicine, Zhejiang University, at telephone: (+86)0571-87219287. (Weekdays 8:00-12:00, 13:30-17:00)**.

I confirm that I have read and understood this Informed Consent Form for the study. I voluntarily agree to accept the treatment methods involved in this study and consent to the use of my medical data for the publication of this study.

Participant Signature: _____

Contact Information: _____Date: _____

Legal Representative Signature (if required): _____
Relationship to Participant: _____
Contact Information: _____ Date: _____
Witness Signature (if required): _____
Contact Information: _____ Date: _____
I confirm that I have explained the details of this study to the patient, including their rights and the potential benefits and risks, and have provided them with a signed copy of this Informed Consent Form.
Investigator Signature: _____
Contact Information: _____ Date: _____