

# Policy on Using Harvested Dental Stem Cells

## Latest Revision

2026

## Abbreviations

AAPD: American Academy of Pediatric Dentistry.

DPSC: Dental pulp stem cells.

DSCs: Dental stem cells.

Majr: Medical subject heading major topic.

MSC: Mesenchymal stem cells.

PDLSC: Periodontal ligament stem cell.

SCAPs: Stem cells from apical papilla.

SHED: Stem cells from human exfoliated deciduous teeth.

Tiab: Title and abstract.

\* *Used in the PubMed search to identify all terms that begin with this truncated base.*

## Purpose

The American Academy of Pediatric Dentistry (AAPD) recognizes the emerging field of regenerative medicine and encourages dentists to follow evidence-based literature in order to educate parents about the collection, storage, viability, and use of dental stem cells with respect to autologous regenerative therapies. The AAPD also recognizes that treatment of humans using harvested dental stem cells is an emerging science which may have applications for oral health care in the future. This policy is related to the use of harvested dental stem cells from a tooth or follicle.

## Methods

This policy was developed by the Council on Clinical Affairs, adopted in 2008<sup>1</sup>, and last revised in 2022.<sup>2</sup> This revision included a review of current dental and medical literature as well as sources of recognized professional expertise related to dental stem cells. A literature search of the PubMed/MEDLINE database was conducted using the terms: (*evidence based dentistry* [Majr] OR *pediatric dentistry* [Majr] OR *dental care for children* [Majr] OR *paediatric dentistry* [Tiab] OR *dental health services* [Majr] OR *dentistry* [Majr] OR *oral health* [Majr]) AND (*dental stem cell\** OR *DSCs* [Tiab] OR *harvested dental stem cell\** OR *mesenchymal stem cell\** OR *MSC* [Tiab] OR *dental pulp stem cell\** OR *DPSC* [Tiab] OR *SHED cell\** OR *periodontal ligament stem cell\** OR *PDLSC* [Tiab] OR *stem cells from apical papilla\** OR *SCAPs* [Tiab] OR *stem cells* [Majr] OR *dental pulp* [Majr] OR *hematopoietic stem cell transplantation* [Majr] OR *stem cell transplantation* [Majr] OR *harvested tooth cell\**); fields: all; limits: within the last 10 years, clinical trial, randomized controlled trial, systematic review, English, resulting in 103 papers that were reviewed by title and abstract. Papers for review were chosen from this list and from the references within selected articles. Expert and/or consensus opinions from experienced researchers and clinicians also were considered.

## Background

Stem cells are pluripotential cells that can divide and multiply for an extended period of time, differentiating into a diverse range of specialized cell types and tissues. Dental stem cells are a minor population of mesenchymal stem cells (MSC) existing in specialized dental tissues, such as dental pulp, periodontium, apical papilla, and dental follicle.<sup>3</sup> Numerous types of stem cells have been isolated from dental tissues, including dental pulp stem cells (DPSC), stem cells isolated from human pulp of exfoliated deciduous teeth (SHED), periodontal ligament stem cells (PDLSC), stem cells from apical papilla (SCAP), and dental follicle cells. All these cells can regenerate tooth tissue to provide a theoretical basis for clinical treatments.<sup>4</sup>

<sup>6</sup> DPSC have received special attention because they represent a readily accessible source of stem cells. Their high plasticity and multipotential capacity to differentiate and produce a variety of dental tissues can be explained by their neural crest origin, which supports applications beyond the scope of oral tissues.<sup>7,8</sup> Stem cells used for regenerative endodontics and scaffolding have demonstrated successful regeneration in laboratory and animal studies<sup>9-11</sup> and in in vivo studies.<sup>5</sup> Dental stem cells-based regenerative medicine provides the possibility to repair damaged dental tissues or generate new teeth.<sup>3,12</sup> Clinical studies for pulpal and periodontal tissue generation using dental tissue-derived stem cells have been published<sup>13</sup>, and evidence that these cells could be beneficial in therapies beyond oral tissues is growing.<sup>8,14</sup> Because of their low immunogenicity, noninvasive sourcing, and strong regenerative and neurogenic potential, dental MSC are highly advantageous relative to other MSC.<sup>15</sup>

The most familiar application of adult stem cell therapy is bone marrow transplantation to treat hematopoietic cancers, metabolic disorders, and congenital immunodeficiency syndromes. Dental stem cells exhibit high potential for multilineage differentiation and immunomodulation, making them valuable tools for in vitro and in vivo differentiation studies as well as the therapy of immune-related diseases.<sup>16</sup> Due to their high differentiation potential and self-renewal capabilities, oral-derived MSC are increasingly recognized as an essential resource for tissue engineering and regenerative and reconstructive medicine.<sup>17,18</sup> Dental MSC are not only easily accessible but also are expandable in vitro with relative genomic stability for a long time.<sup>19</sup> Several preclinical studies and clinical trials have been performed using dental MSC in the treatment of multiple dental and nondental ailments<sup>19</sup>, ranging from bone, periodontal, and endodontic regeneration<sup>8</sup> to therapeutics for neurological diseases and stroke.<sup>20</sup> Recently, a clinical trial using DPSC has shown promising clinical outcomes in patients with periodontitis, albeit with notable variation of results, limited generalizability, and concerns regarding allogenicity.<sup>13</sup> Human exfoliated deciduous teeth stem cells have shown promise in an initial small safety-phase clinical trial for treating a nondental disease.<sup>21</sup>

The public is increasingly aware of this emerging science, and more parents are expressing interest in harvesting/banking dental stem cells. Parents already may elect to preserve umbilical cord blood of their child for future harvesting of stem cells if autologous regenerative therapies are indicated. Pulpal tissue of exfoliating primary teeth, surgically removed third molars, periodontal ligament<sup>22</sup>, and gingival fibroblasts<sup>22</sup> also may serve as a source of MSC for consideration in the future.<sup>10</sup> While sources of dental stem cells are readily accessible, those cells must be secured and stored properly to maintain the potential to proliferate and differentiate.<sup>23</sup> Ongoing clinical trials using human DPSC may be searched using the web-based resources of the National Library of Medicine at the National Institutes of Health.<sup>24</sup>

## Policy statement

While no treatment using harvested dental stem cells in humans is currently available, the AAPD recognizes this is an emerging science which may have application for oral health care and treatment of systemic conditions. As technology continues to evolve, the process of procurement of dental stems cells should be accomplished only with deliberate integrity and appropriate informed consent to assure the highest ethical standards and quality of outcomes.

## References

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