

# ACE SMILE MIRROR

## A Framework for Personalised Smile Visualisation

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### Abstract

ACE SMILE MIRROR is a framework for presenting a personalised, photographic smile visualisation before a clinical consultation. It combines guided image acquisition, source-relative aesthetic direction, reference-guided generative imaging, bounded mouth-region compositing, candidate assessment and a traceable comparison view. Its organising principle is that a convincing smile preview requires agreement between tooth form, visible scale, material appearance and the surrounding photograph. Increased brightness alone does not constitute a design. The framework separates three tasks: expressing an aesthetic intention, producing a coherent visual simulation, and determining clinical feasibility. Only the first two belong to the photographic preview. This manuscript describes the conceptual method, its relationship to the ACE Smile Index and The Aesthete Protocol, and the limitations of interpreting a two-dimensional generated image. It does not report a clinical trial, a validated diagnostic system or a manufacturing-ready dental design. The contribution is a documented combination of aesthetic governance and image-processing stages intended to support a more specific conversation between the person viewing the preview and the clinical team.

**Keywords:** ACE SMILE MIRROR; smile visualisation; aesthetic dentistry; generative imaging; photographic simulation; patient communication; smile design.

# 1. Purpose and scope

A person considering a change to their smile may understand an image more readily than a description of tooth form, translucency or proportion. However, a persuasive image can also create unjustified expectations. ACE SMILE MIRROR treats the preview as an illustration of an aesthetic direction that can be questioned and revised at consultation.

The framework brings the user's own photograph together with a documented aesthetic rule set and selected reference material. The output remains recognisably connected to the input portrait. The intended conversation concerns preferences: the relationship between central and lateral teeth, apparent scale, the rhythm of the smile, and the character of the surface. It does not establish which intervention is appropriate or whether a depicted change is achievable.

The name ACE SMILE MIRROR refers both to this methodological framework and to its browser-based implementation at ACE DNTL STUDIO. The framework description is broader than a particular model release or interface arrangement. Version 1.0 documents the current conceptual sequence without disclosing source code, proprietary prompts, reference assets or numerical selection parameters.

## 2. Aesthetic principles

### 2.1 Source-relative proportion

The photograph provides the visible context for scale. A reference smile contributes design language; it does not supply the user's tooth dimensions. The apparent size of the front teeth, the available smile opening and the relationship to the lips constrain the visual proposal. A modest smile opening calls for a correspondingly restrained composition. Enlarging the front teeth to make a transformation more obvious can weaken the result.

The direction distinguishes refinement from enlargement. Apparent wear, low tooth display and genuinely long-looking teeth require different visual treatment. These observations remain uncertain photographic observations. Without calibration and clinical examination, an image cannot establish an exact amount of tooth loss or prescribe a dimensional correction.

### 2.2 Individual forms within a coherent composition

The design considers the different roles of central incisors, lateral incisors, canines and visible posterior teeth. Contour, corner treatment, incisal relationships, contacts and the progression towards the corners of the smile contribute to the overall impression. A uniform row of repeated white shapes is insufficient.

Apparent alignment and lateral fullness can be explored while retaining the facial context. A broader-looking composition should arise from coherent visible tooth forms and lighting, rather than simply whitening dark spaces. The image cannot establish an anatomical arch diagnosis or determine the movement required to achieve that appearance.

### 2.3 Material appearance within the photograph

Brightness, translucency, surface character and internal depth are considered together. The intended appearance avoids a flat, opaque white surface. Translucency belongs within the permitted tooth outline; it should not be simulated by making an incisal edge longer. Differences in tooth form should remain legible without an exaggerated gloss.

The surrounding exposure matters. Teeth in a dim or softly lit photograph should not appear to have been photographed under unrelated studio lighting. Texture, shadow and edge softness must be considered with colour. A screen image illustrates an appearance and does not specify a ceramic material, measured shade or laboratory prescription.

## 2.4 Facial continuity and visible gingival relationships

The portrait supplies the identity, expression and setting against which the proposal is judged. The image-processing stages aim to preserve that context and control changes around the mouth. A proposal may explore a different apparent relationship between teeth and visible gingiva, but should not achieve it by arbitrarily enlarging crowns or changing the person's expression. Such a proposal is an aesthetic possibility to discuss; it does not determine periodontal, orthodontic, restorative or surgical feasibility.

# 3. Operational sequence

The sequence is: **acquire > prepare > describe > generate > composite > assess > compare > discuss**. Each stage has a different role, and success at one stage does not certify the others.

## 3.1 Acquire an image

The user enters through a website or QR-linked browser experience and either captures a photograph or chooses an existing image. Guided capture provides cues concerning face position, lighting and a visible smile. A library upload follows a corresponding image-intake path.

The aim is a usable facial image with sufficient visible dental information. Blur, occlusion, deep shadow, unusual pose and an almost closed smile reduce what the system can infer or depict reliably. Capture guidance improves the input opportunity; it does not guarantee a suitable photograph.

## 3.2 Prepare and locate

The application prepares a working portrait and identifies the mouth and surrounding landmarks. Preparation can include orientation, framing, resizing, exposure adjustment and light retouching. The working portrait is therefore distinct from the unmodified camera file or uploaded original.

This distinction matters for claims of image preservation. Bounded compositing is designed to retain the surrounding prepared portrait. It should not be described as preserving every original file pixel through the entire workflow. The working image and the displayed comparison should use a consistent frame so that preparation does not masquerade as a dental transformation.

## 3.3 Describe the visible design context

Image-derived observations and a limited vision-classification step inform the design context, including apparent tooth display, visible wear and gingival display. Their purpose is to guide the visualisation and subsequent comparisons. They are not findings from a dental examination.

Uncertainty is material: lighting and overlap can make a short visible tooth band look like wear, while an altered expression can change apparent gingival display. The framework therefore keeps photographic observations separate from clinical diagnoses and avoids presenting apparent pixel relationships as calibrated measurements.

### 3.4 Generate candidate visualisations

The prepared image is combined with the governing aesthetic direction and selected visual references. Reference material informs morphology and material appearance, while the source portrait constrains the composition. A general-purpose generative image system produces candidate mouth-region visualisations.

The current implementation evaluates multiple candidates. Generative output varies, so a plausible candidate does not prove repeatability and a poor candidate does not establish that the intended design is clinically impossible. The framework does not depend on a claim that ACE trained a proprietary foundation model. Its documented contribution concerns the aesthetic direction and the surrounding workflow.

### 3.5 Restore placement and composite

Candidate output is restored to the working portrait's coordinates. Placement checks and controlled alignment seek to keep the designed region consistent with the photographed mouth. Bounded compositing and lip-region protection aim to prevent unrelated changes to the surrounding face and setting.

The quality of the final composite is assessed separately from the attractiveness of the isolated generated teeth. A convincing tooth texture cannot compensate for an altered expression, displaced mouth, duplicated lip boundary or visible join. Landmark estimation, masking and blending remain fallible, particularly with low-quality input.

### 3.6 Assess and select

The implementation measures and compares candidate images within the visible smile opening. Placement, apparent tooth extent, brightness, gingival appearance and boundary consistency contribute to eligibility and ranking. It can reject unusable candidates and provides a failure path when a usable result cannot be delivered.

Ranking is an engineering selection step, not a clinical score. It attempts to reduce known visual failures but cannot certify anatomical accuracy, ideal aesthetics or universal compliance with the design direction. Some selection decisions involve relative preferences and fallback handling. A displayed result remains open to human rejection or revision.

### 3.7 Present and carry into consultation

The comparison view labels the prepared source as **TODAY** and the simulation as **DESIGNED**. A design reference helps distinguish the selected preview from another attempt. Export and consultation actions let the user keep an image or bring the specific design into a subsequent conversation.

The design reference is a communication aid. It is not a treatment authorisation, verified identity credential or proof that the depicted geometry can be manufactured. At consultation, the clinical team can discuss which aspects are desired, which are uncertain and which require a different direction after examination.

## 4. Quality control and evaluation

Version 1.0 describes an implemented workflow and its intended quality principles. It does not present a prospectively defined clinical study or numerical evidence of effectiveness. Internal development checks should not be represented as independent validation.

A useful evaluation programme would separate technical integrity from aesthetic judgement. Technical review would inspect placement, image boundaries, decoding, source-to-preview alignment and failure handling. Aesthetic review would examine proportion, individual forms, material appearance and integration with the photograph. User understanding would be assessed separately: can participants correctly identify the image as a simulation and explain its limits?

Evaluation should include difficult inputs as well as visually favourable photographs, with differences in lighting, camera quality, complexion, pose, tooth display and visible dental conditions. Reviewers should see the same source and final composite and distinguish uncertain observations from clear failures. Repeated runs on the same input would help characterise variation. Any later published performance claim should identify the tested version, sampling method, exclusion criteria, review process and observed failure rate.

Clinical transfer requires a separate study. Agreement between an attractive preview and a later treatment outcome cannot be assumed from image quality. Patient preferences, feasibility, necessary changes during planning and differences between preview and delivered result would need their own documented assessment.

## 5. Clinical and technical limits

A single photograph does not supply root anatomy, periodontal status, hidden surfaces, tooth vitality, occlusal relationships or a complete medical and dental history. Perspective and lighting can distort apparent proportions. Generated details may be visually convincing without corresponding to the user's anatomy.

Consequently, ACE SMILE MIRROR does not diagnose disease, establish candidacy, prescribe tooth preparation, determine a treatment plan or guarantee an outcome. It does not establish physical millimetres from an uncalibrated image. Apparent gingival changes or tooth movements in a preview may require a different clinical approach, or may be unsuitable after assessment.

Model variation, face-landmark errors, ambiguous tooth boundaries, screen colour and network or processing failures remain practical limitations. A rendered image is not proof that these limitations have been resolved. The framework's communication value depends in part on maintaining that distinction at the point of viewing.

## 6. Relationship to other ACE frameworks

The ACE Smile Index is a separately published framework for evaluating cosmetic dental outcomes.[1] The Aesthete Protocol, Volume I, describes a wider clinical thinking system, including consultation, documentation, case selection and review.[2] ACE SMILE MIRROR applies a related aesthetic direction to an earlier, photographic communication task.

These are related works with different scopes. A generated preview does not receive a clinical ACE Smile Index score merely because it follows this visualisation workflow. It cannot establish marginal integrity, material durability, occlusal harmony or other matters requiring clinical evidence. References to the other frameworks identify the author's wider body of work; they do not transfer clinical validation to the software.

## 7. Boundary with future scan-backed design

Moving from a photograph to a physical mock-up requires additional information and work. A future connection to dental CAD would need verified scans, appropriate bite records, photo registration, fitted three-dimensional geometry and professional review. A generative photograph cannot supply hidden surfaces or demonstrate fit.

Such integration is outside the demonstrated scope of this publication. The current preview may communicate a desired appearance to a clinical or laboratory team. It is not itself an exportable dental restoration, validated CAD model, printable wax-up or fabrication instruction.

## 8. Authorship, availability and version record

Arslan Korkchi, professionally known as Dr. Ace Korkchi, is credited as the creator of ACE SMILE MIRROR and its governing aesthetic framework at ACE DNTL STUDIO. This author-issued manuscript records that attribution and the scope of Version 1.0. It does not assert first-in-world priority, a patent grant or registered trademark status.

The author's affiliation is with the commercial provider of the described implementation. No independent clinical validation is claimed. No patient photographs, personal case records, source code, proprietary prompts, reference-image collection or internal parameter tables accompany this manuscript. The conceptual description supports scrutiny of the method and its boundaries; it is not a complete reproducibility package.

**Version record:** Version 1.0, prepared 9 September 2026. First methodological manuscript under this title. The publication date and persistent identifier will be recorded by the publication repository. Later substantive changes should be issued as identified versions rather than silently changing the meaning of this record.

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