

```
In [14]: import cv2
import os
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import random
from skimage import transform
import shutil
import math
from sympy import symbols, Eq, solve
```

## Position A:

Description: The occlusal plane of the impacted tooth is at the same level as the occlusal plane of the 2nd molar, or above. (The highest portion of the impacted 3rd molar is on a level with the occlusal plane, or above).

## Position B:

Description: The occlusal plane of the impacted tooth is between the occlusal plane and the cervical margin of the 2nd molar. (The highest portion of the impacted 3rd molar is below the occlusal plane but above the cervical line of the 2nd molar).

## Position C:

Description: The occlusal plane of the impacted tooth is below the cervical margin of the 2nd molar. (The highest portion of the impacted 3rd molar is below the cervical line of the 2nd molar).

```
In [15]: def calculate_y(x1, y1, x2, y2, x5):
    m = (y2 - y1) / (x2 - x1)

    x, y = symbols('x y')
    eq1 = Eq(y - y2 - (m * x - m * x2), 0)
    eq2 = Eq(x - x5, 0)

    solution = solve([eq1, eq2], [x, y])

    x_value = solution[x]
    y_value = solution[y]

    y_value = round(y_value)

    return y_value
```

```
In [16]: def determine_classification(x1, y1, x2, y2, x3, y3, x4, y4, x5, y5):
    # Calculate the y-coordinate where the line passing through points 1 and 2
    y_top = calculate_y(x1, y1, x2, y2, x5)
    y_bottom = calculate_y(x3, y3, x4, y4, x5)
```

```
if y5 < y_top:  
    return 'A'  
elif y5 >= y_top and y5 <= y_bottom:  
    return 'B'  
else:  
    return 'C'
```

```
In [17]: def load_actual_classifications(actual_file):  
    """  
        Load the actual classifications from the provided CSV file.  
  
    Parameters:  
        actual_file (str): Path to the CSV file containing actual classifications  
  
    Returns:  
        dict: A dictionary mapping image names to their actual classifications  
    """  
    actual_df = pd.read_csv(actual_file)  
    return dict(zip(actual_df['NO'], actual_df['PG-38']))
```

```
In [18]: def plot_images_with_coordinates_from_csv_file(csv_file, image_dir, num_images):  
    """  
        Plots points on random images based on coordinates from a CSV file and displays them.  
        Visualizes lines connecting specific landmarks for Pell and Gregory classifiers.  
  
    Parameters:  
        csv_file (str): Path to the CSV file containing coordinates.  
        image_dir (str): Path to the folder containing images.  
        num_images_to_plot (int): Number of random images to plot (default is 10).  
    """  
    # Read the CSV file into a DataFrame  
    df = pd.read_csv(csv_file)  
  
    # Randomly select num_images_to_plot rows from the DataFrame  
    selected_rows = df.sample(n=num_images_to_plot)  
  
    # Iterate over the selected rows  
    for _, row in selected_rows.iterrows():  
        # Extract the image name from the 'IMAGE' column  
        image_name = row['IMAGE'] + '.png'  
        image_path = os.path.join(image_dir, image_name)  
  
        # Check if the image file exists  
        if not os.path.exists(image_path):  
            print(f"Error: Image file not found - {image_path}")  
            continue  
  
        # Read the image  
        img = cv2.imread(image_path)  
  
        # Check if the image is empty  
        if img is None or img.size == 0:  
            print(f"Error: Unable to read image - {image_path}")  
            continue  
  
        # Extract coordinates from the row  
        coordinates = [(row[f'{i}-X'], row[f'{i}-Y']) for i in range(1, 6)]
```

```

# Draw points on the image for each set of coordinates
for i, (x, y) in enumerate(coordinates, 1):

    x, y = int(x), int(y)
    # Generate a unique color for each point
    color = (0, 255, 0) # Green color

        # Increase the size of the dot
    cv2.circle(img, (x, y), 5, color, -1)

        # Label the point with a number
    cv2.putText(img, str(i), (x - 10, y - 10), cv2.FONT_HERSHEY_SIMPLEX, 1, color, 2)

# Draw lines and label Pell and Gregory classification
# Assuming landmark 1, landmark 2, landmark 3, landmark 4, and landmark 5
x1, y1 = map(int, coordinates[0]) # Point 5
x2, y2 = map(int, coordinates[1]) # Point 1
x3, y3 = map(int, coordinates[2]) # Point 2
x4, y4 = map(int, coordinates[3]) # Point 3
x5, y5 = map(int, coordinates[4]) # Point 4

# Draw lines connecting landmarks
cv2.line(img, (x1, y1), (x2, y2), (255, 0, 0), 2)
# cv2.line(img, (x2, y2), (x3, y3), (255, 0, 0), 2)
cv2.line(img, (x3, y3), (x4, y4), (255, 0, 0), 2)
# cv2.line(img, (x4, y4), (x5, y5), (255, 0, 0), 2)

# Label the image based on Pell and Gregory classification
classification_label = determine_classification(x1, y1, x2, y2, x3, y3, x4, y4, x5, y5)
cv2.putText(img, classification_label, (10, 30), cv2.FONT_HERSHEY_SIMPLEX, 1, color, 2)

# Display the image with points and lines using matplotlib
img_rgb = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
plt.imshow(img_rgb)
plt.title(f"Image with Points and Classification: {image_name}")
plt.axis('off')
plt.show()

```

In [19]:

```

def plot_images_with_coordinates(image_name, csv_file, image_dir):
    """
    Plots points on a specific image based on coordinates from a CSV file and
    Visualizes lines connecting specific landmarks for Pell and Gregory classification.

    Parameters:
        image_name (str): Name of the image file without extension.
        csv_file (str): Path to the CSV file containing coordinates.
        image_dir (str): Path to the folder containing images.
    """
    # Read the CSV file into a DataFrame
    df = pd.read_csv(csv_file)

    # Extract the row corresponding to the provided image name
    row = df[df['IMAGE'] == image_name].iloc[0]

    # Extract the image path
    image_path = os.path.join(image_dir, f"{image_name}.png")

    # Check if the image file exists
    if not os.path.exists(image_path):
        raise FileNotFoundError(f"Image file {image_name}.png not found in directory {image_dir}.")

    # Plot the image with points and lines
    plot_images_with_coordinates(image_name, csv_file, image_dir)

```

```

if not os.path.exists(image_path):
    print(f"Error: Image file not found - {image_path}")
    return

# Read the image
img = cv2.imread(image_path)

# Check if the image is empty
if img is None or img.size == 0:
    print(f"Error: Unable to read image - {image_path}")
    return

# Extract coordinates from the row
coordinates = [(row[f'{i}-X'], row[f'{i}-Y']) for i in range(1, 6)]

# Draw points on the image for each set of coordinates
for i, (x, y) in enumerate(coordinates, 1):
    x, y = int(x), int(y)
    # Generate a unique color for each point
    color = (0, 255, 0) # Green color

    # Increase the size of the dot
    cv2.circle(img, (x, y), 5, color, -1)

    # Label the point with a number
    cv2.putText(img, str(i), (x - 10, y - 10), cv2.FONT_HERSHEY_SIMPLEX, 0.5, color)

# Draw lines and label Pell and Gregory classification
# Assuming landmark 1, landmark 2, landmark 3, landmark 4, and landmark 5
x1, y1 = map(int, coordinates[0]) # Point 5
x2, y2 = map(int, coordinates[1]) # Point 1
x3, y3 = map(int, coordinates[2]) # Point 2
x4, y4 = map(int, coordinates[3]) # Point 3
x5, y5 = map(int, coordinates[4]) # Point 4

# Draw lines connecting landmarks
cv2.line(img, (x1, y1), (x2, y2), (255, 0, 0), 2)
cv2.line(img, (x2, y2), (x3, y3), (255, 0, 0), 2)
cv2.line(img, (x3, y3), (x4, y4), (255, 0, 0), 2)
cv2.line(img, (x4, y4), (x5, y5), (255, 0, 0), 2)

# Label the image based on Pell and Gregory classification
classification_label = determine_classification(x1, y1, x2, y2, x3, y3, x4, y4, x5, y5)
cv2.putText(img, classification_label, (10, 30), cv2.FONT_HERSHEY_SIMPLEX, 0.5, (0, 255, 0))

# Display the image with points and lines using matplotlib
img_rgb = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
plt.imshow(img_rgb)
plt.title(f"Image with Points and Classification: {image_name}")
plt.axis('off')
plt.show()

```

In [20]:

```

def plot_image_with_coordinates_from_csv(csv_file, image_dir, image_name):
    """
    Plots points on a specific image based on coordinates from a CSV file and visualizes lines connecting specific landmarks for Pell and Gregory classification.

    Parameters:
        csv_file (str): Path to the CSV file containing coordinates.
    """

```

```

        image_dir (str): Path to the folder containing images.
        image_name (str): Name of the specific image to plot.
    """

# Read the CSV file into a DataFrame
df = pd.read_csv(csv_file)

# Find the row corresponding to the specified image name
selected_row = df[df['IMAGE'] == image_name[:-4]]

# Check if the image file exists
image_path = os.path.join(image_dir, image_name)
if not os.path.exists(image_path):
    print(f"Error: Image file not found - {image_path}")
    return

# Read the image
img = cv2.imread(image_path)

# Check if the image is empty
if img is None or img.size == 0:
    print(f"Error: Unable to read image - {image_path}")
    return

# Extract coordinates from the row
coordinates = [(selected_row[f'{i}-X'].values[0], selected_row[f'{i}-Y'].values[0]) for i in range(1, 6)]

# Draw points on the image for each set of coordinates
for i, (x, y) in enumerate(coordinates, 1):
    x, y = int(x), int(y)
    # Generate a unique color for each point
    color = (0, 255, 0) # Green color

    # Increase the size of the dot
    cv2.circle(img, (x, y), 5, color, -1)

    # Label the point with a number
    cv2.putText(img, str(i), (x - 10, y - 10), cv2.FONT_HERSHEY_SIMPLEX, 0.8, color, 2)

# Draw lines and label Pell and Gregory classification
# Assuming landmark 1, landmark 2, landmark 3, landmark 4, and landmark 5
x1, y1 = map(int, coordinates[0]) # Point 5
x2, y2 = map(int, coordinates[1]) # Point 1
x3, y3 = map(int, coordinates[2]) # Point 2
x4, y4 = map(int, coordinates[3]) # Point 3
x5, y5 = map(int, coordinates[4]) # Point 4

# Calculate y_top and y_bottom using the provided function calculate_y
y_top = int(calculate_y(x1, y1, x2, y2, x5))
y_bottom = int(calculate_y(x3, y3, x4, y4, x5))

# Draw lines connecting landmarks
cv2.line(img, (x1, y1), (x2, y2), (255, 0, 0), 2)
cv2.line(img, (x3, y3), (x4, y4), (255, 0, 0), 2)
cv2.line(img, (x2, y2), (x5, y_top), (0, 0, 255), 2)
cv2.line(img, (x4, y4), (x5, y_bottom), (0, 0, 255), 2)

# Label the image based on Pell and Gregory classification
classification_label = determine_classification(x1, y1, x2, y2, x3, y3, x4, y4, x5, y5)
cv2.putText(img, classification_label, (10, 30), cv2.FONT_HERSHEY_SIMPLEX, 0.8, (0, 0, 255), 2)

```

```

# Display the image with points and lines using matplotlib
img_rgb = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
plt.imshow(img_rgb)
plt.title(f"Image with Points and Classification: {image_name}")
plt.axis('off')
plt.show()

```

In [32]:

```

predicted_file = '../trained-models/37-38-PELLGREGORY/37-38-PG-Predictions.csv'
actual_file = '../data/dataset/annotations/classifications/37-38-PG.csv'
image_dir = '../data/dataset/resized/images'

```

In [33]:

```

def calculate_classification_accuracy(predicted_file, actual_file):
    """
    Calculate the classification accuracy based on predicted and actual classifications.

    Parameters:
        predicted_file (str): Path to the CSV file containing predicted classifications.
        actual_file (str): Path to the CSV file containing actual classifications.

    Returns:
        float: Classification accuracy.
    """

    # Load actual classifications
    actual_classifications = load_actual_classifications(actual_file)

    # Load predicted classifications
    predicted_df = pd.read_csv(predicted_file)

    # Initialize variables for correct predictions
    correct_predictions = 0

    # Iterate over rows in the predicted DataFrame
    for _, row in predicted_df.iterrows():
        image_name = row['IMAGE']

        predicted_classification = determine_classification(
            row['1-X'], row['1-Y'], row['2-X'],
            row['2-Y'], row['3-X'], row['3-Y'], row['4-X'], row['4-Y'], row['5-X'])

        # Check if the predicted classification matches the actual classification
        # Print information for each row

        actual_classification = actual_classifications.get(image_name)

        print(f"Image: {image_name}.png")
        print(f"Actual Classification: {actual_classification}")
        print(f"Predicted Classification: {predicted_classification}")
        print("-" * 30)

        if actual_classification and predicted_classification == actual_classification:
            correct_predictions += 1
        else:
            image = image_name + '.png'
            plot_image_with_coordinates_from_csv(predicted_file, image_dir, image)

    # Calculate classification accuracy
    total_images = len(predicted_df)

```

```
accuracy = correct_predictions / total_images if total_images > 0 else 0
print(f"Accuracy: {accuracy:.2f}% ({correct_predictions}/{total_images})")

return accuracy
```

In [34]: `calculate_classification_accuracy(predicted_file, actual_file)`

```
Image: 1-e-27.png
Actual Classification: A
Predicted Classification: A
-----
Image: 11-e-29.png
Actual Classification: A
Predicted Classification: A
-----
Image: 117-118-e.png
Actual Classification: B
Predicted Classification: B
-----
Image: 122-e-26.png
Actual Classification: A
Predicted Classification: B
-----
```

Image with Points and Classification: 122-e-26.png

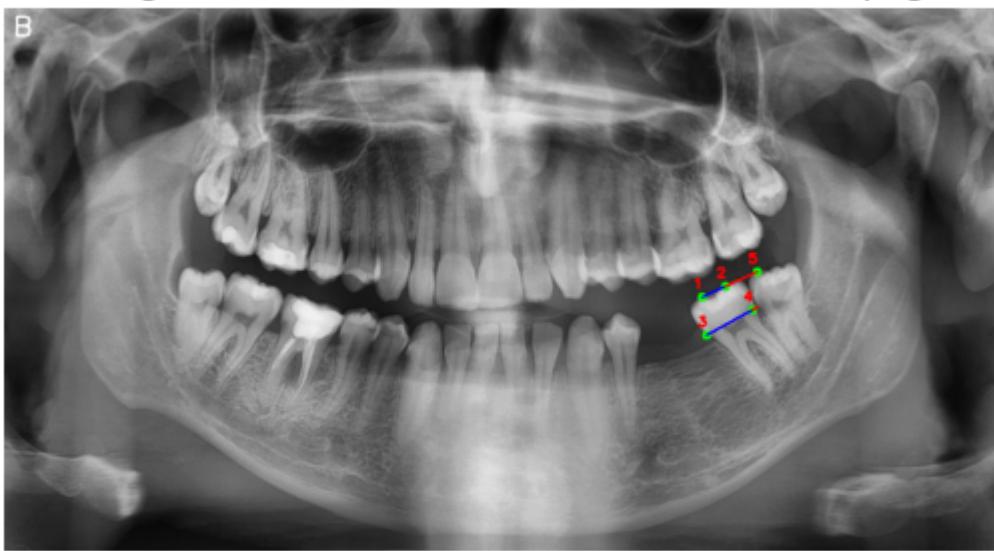


Image: 131-126-k.png  
Actual Classification: B  
Predicted Classification: B

---

Image: 133-e-45.png  
Actual Classification: A  
Predicted Classification: A

---

Image: 137-k.png  
Actual Classification: A  
Predicted Classification: A

---

Image: 139-k.png  
Actual Classification: A  
Predicted Classification: A

---

Image: 140-k.png  
Actual Classification: A  
Predicted Classification: B

---

#### Image with Points and Classification: 140-k.png

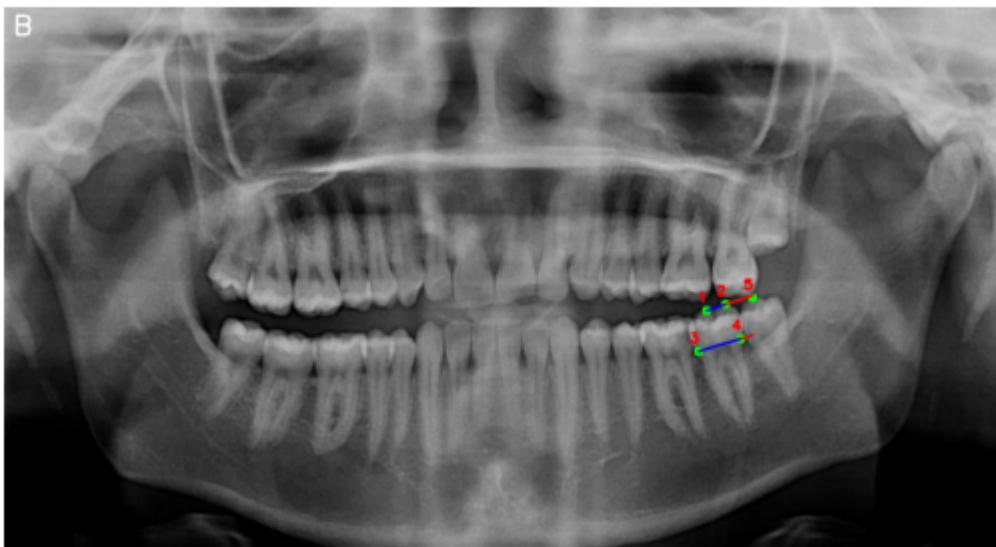


Image: 142-k.png  
Actual Classification: A  
Predicted Classification: B

---

**Image with Points and Classification: 142-k.png**

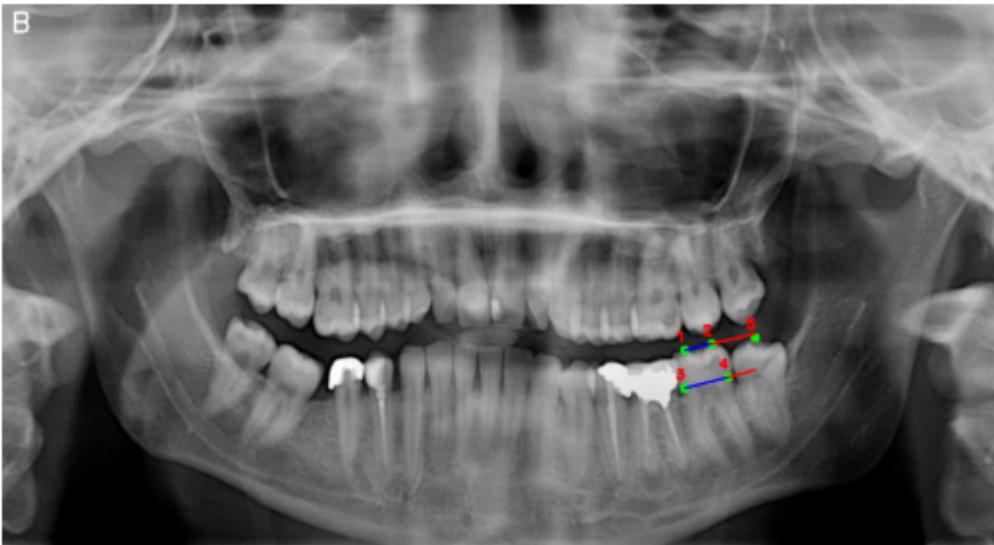


Image: 143-681-e.png

Actual Classification: B

Predicted Classification: B

-----  
Image: 147-k.png

Actual Classification: C

Predicted Classification: C

-----  
Image: 149-e.png

Actual Classification: A

Predicted Classification: B

**Image with Points and Classification: 149-e.png**

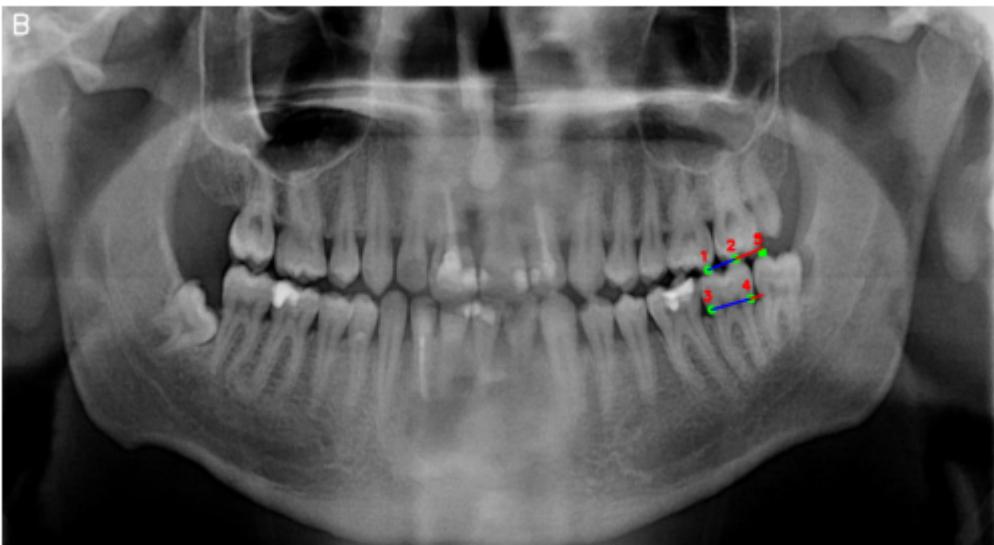


Image: 15-e-22.png

Actual Classification: A

Predicted Classification: B

-----

Image with Points and Classification: 15-e-22.png

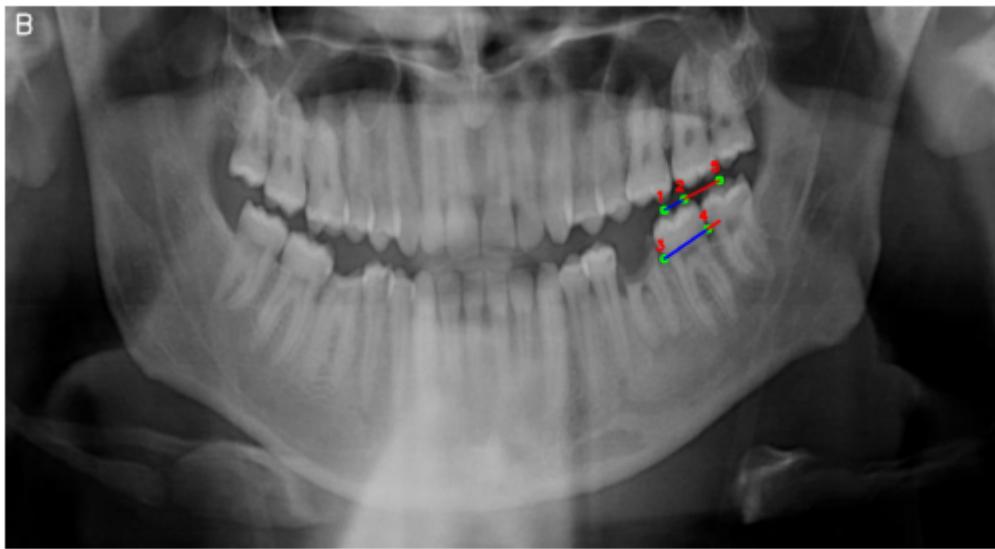


Image: 152-k.png

Actual Classification: A

Predicted Classification: A

-----  
Image: 154-132-k.png

Actual Classification: B

Predicted Classification: B

-----  
Image: 156-k-29.png

Actual Classification: A

Predicted Classification: A

-----  
Image: 160-k.png

Actual Classification: A

Predicted Classification: B

-----  
**Image with Points and Classification: 160-k.png**

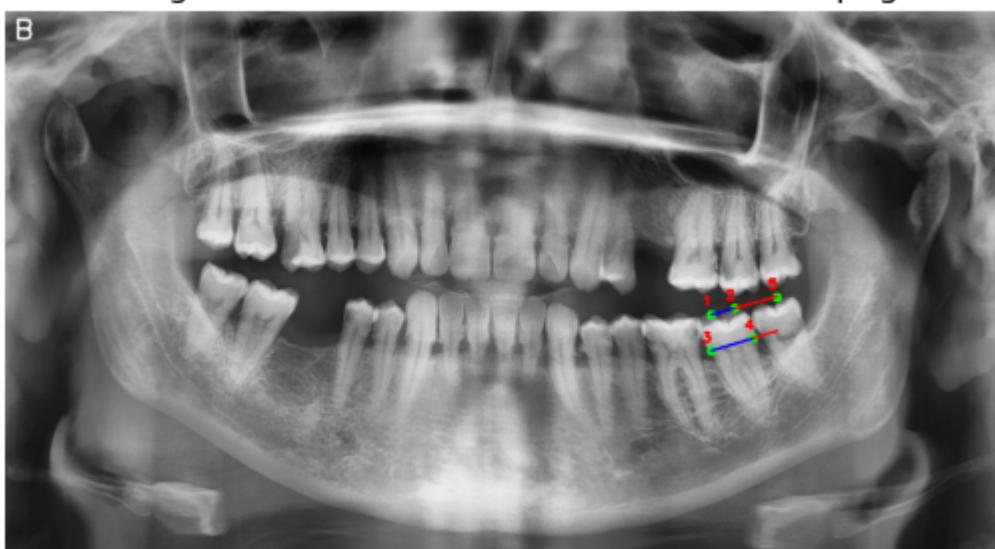


Image: 162-134-e.png  
Actual Classification: C  
Predicted Classification: C

---

Image: 165-135-k.png  
Actual Classification: B  
Predicted Classification: B

---

Image: 170-k-23.png  
Actual Classification: A  
Predicted Classification: B

---

**Image with Points and Classification: 170-k-23.png**

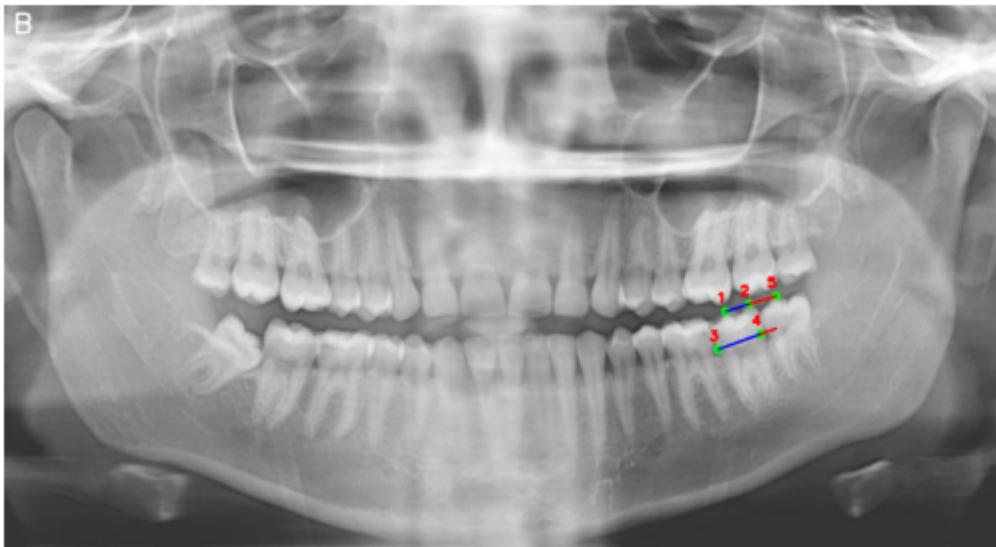


Image: 171-k-20.png  
Actual Classification: A  
Predicted Classification: A

---

Image: 173-k-21.png  
Actual Classification: A  
Predicted Classification: A

---

Image: 175-k-52.png  
Actual Classification: A  
Predicted Classification: A

---

Image: 178-e-29.png  
Actual Classification: A  
Predicted Classification: B

---

Image with Points and Classification: 178-e-29.png

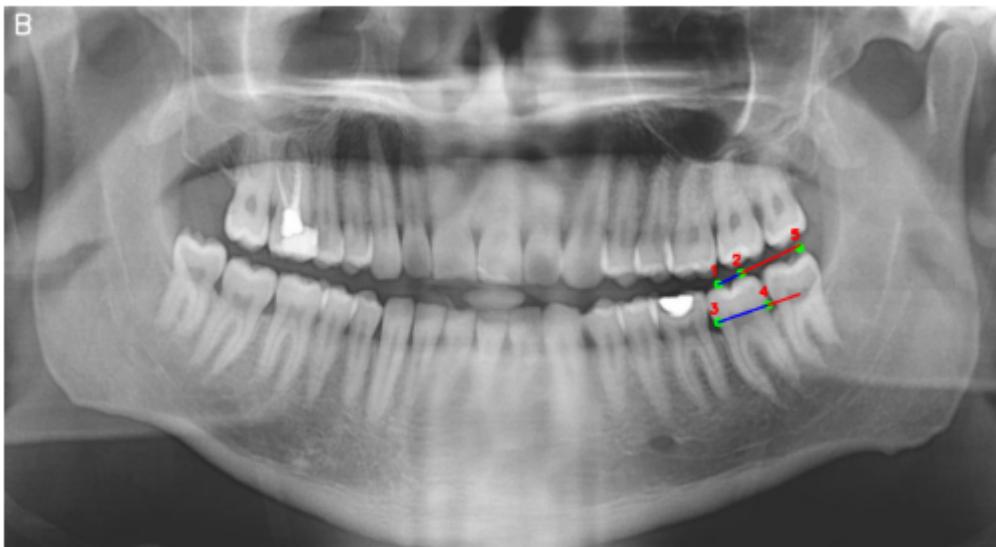


Image: 181-e-32.png

Actual Classification: B

Predicted Classification: B

-----  
Image: 185-k-31.png

Actual Classification: A

Predicted Classification: B

-----  
Image with Points and Classification: 185-k-31.png

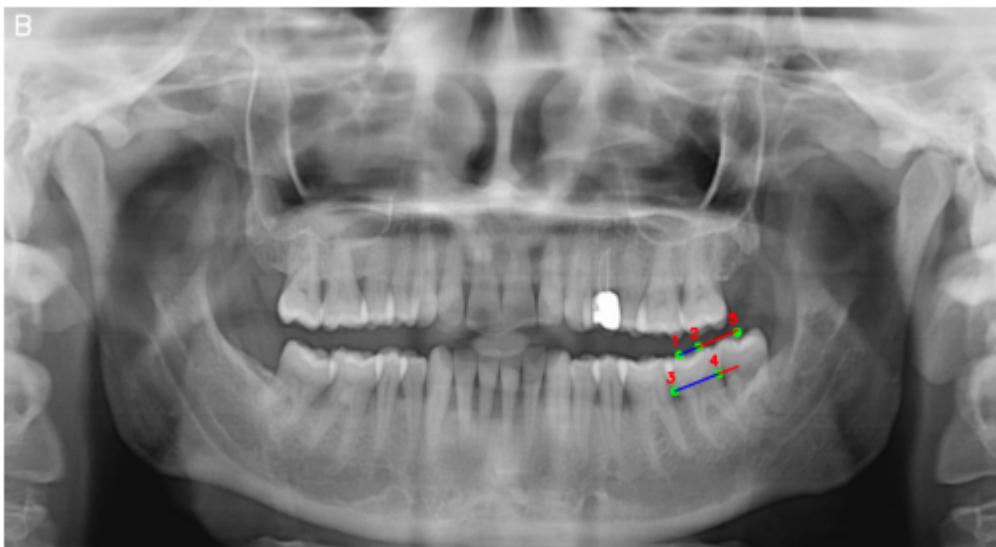


Image: 186-e-21.png

Actual Classification: B

Predicted Classification: A

-----

Image with Points and Classification: 186-e-21.png

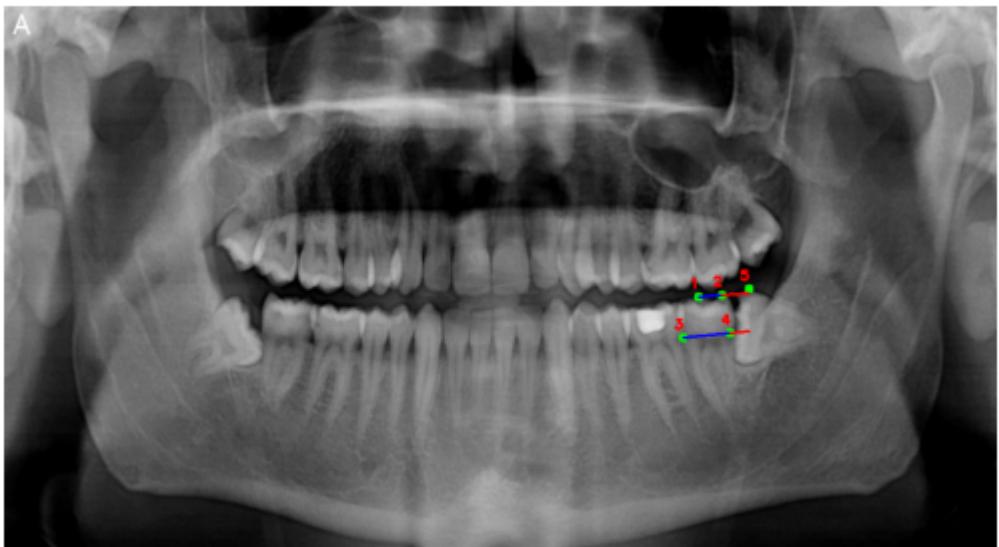


Image: 193-e-39.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 198-k-20.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 21-k-25.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 22-e-33.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 220-k-22.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 226-e-30.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 24-e-21.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 249-e-25.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 265-e-21.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 27-k-33.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 277-e-17.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 28-k-22.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 29-e-22.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 30-31-52.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 30-e-28.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 315-e-21.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 341-e-52.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 343-344.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 353-e-20.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 354-k-18.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 357-k-20.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 361-e-28.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 362-e-40.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 364-k-37.png  
Actual Classification: A  
Predicted Classification: B

-----

Image with Points and Classification: 364-k-37.png

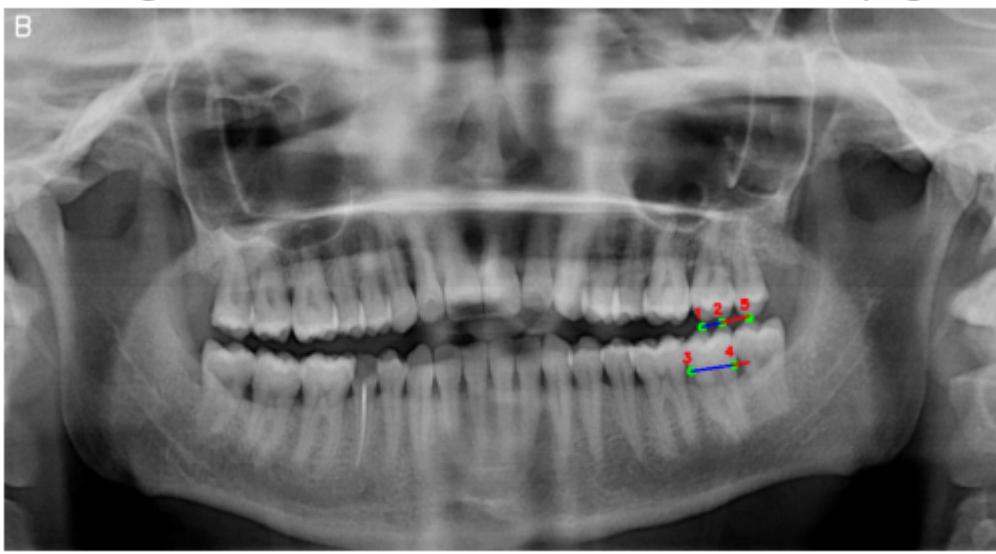


Image: 365-e-25.png

Actual Classification: B

Predicted Classification: B

-----  
Image: 367-k-18.png

Actual Classification: A

Predicted Classification: B

-----  
Image with Points and Classification: 367-k-18.png

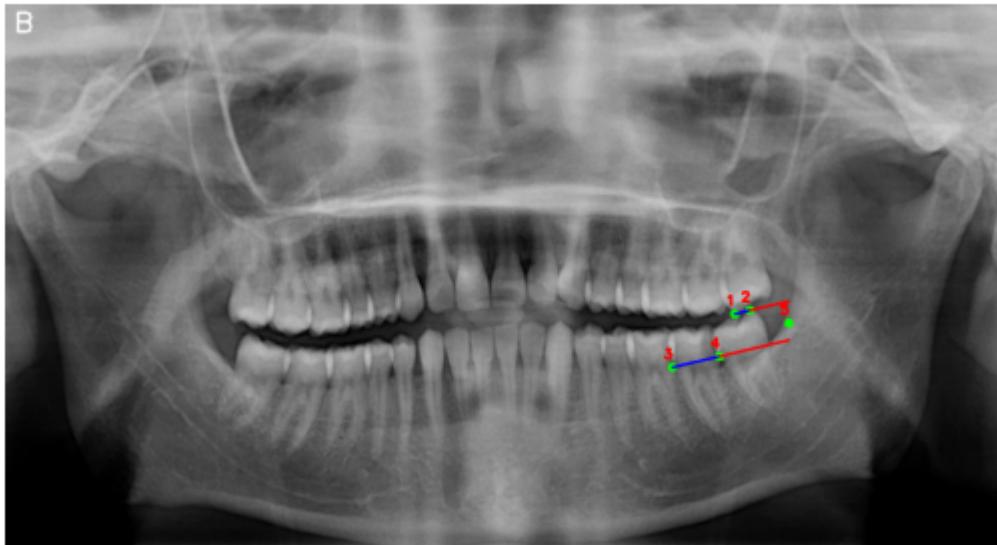


Image: 372-k-16.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 374-k-45.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 375-k-23.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 376-k-18.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 377-e-52.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 378-e-23.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 379-k-31.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 385-e-24.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 387-e-24.png  
Actual Classification: A  
Predicted Classification: B

-----

Image with Points and Classification: 387-e-24.png

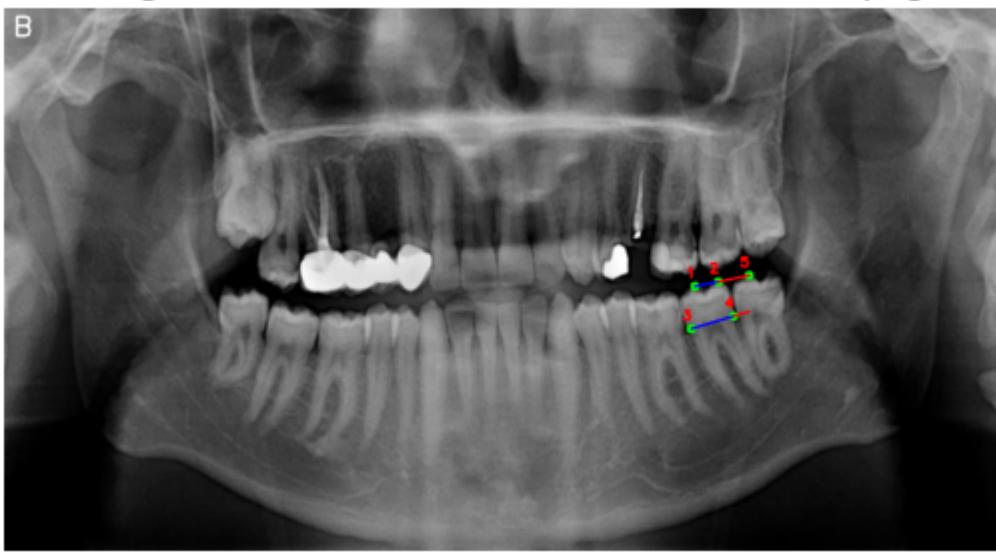


Image: 389-e-21.png  
Actual Classification: B  
Predicted Classification: B

---

Image: 390-e-32.png  
Actual Classification: A  
Predicted Classification: A

---

Image: 391-k-20.png  
Actual Classification: A  
Predicted Classification: B

---

**Image with Points and Classification: 391-k-20.png**

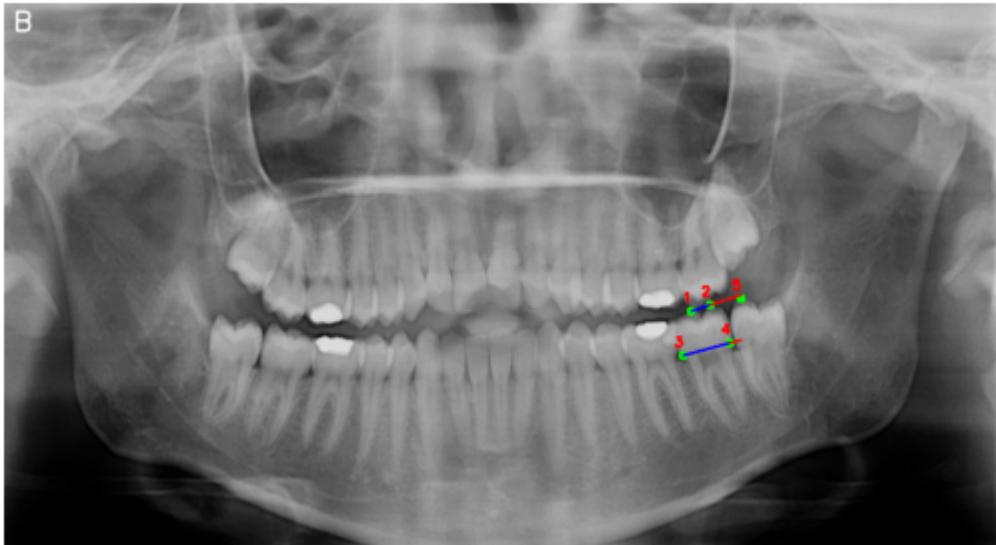


Image: 392-e-23.png  
Actual Classification: B  
Predicted Classification: B

---

Image: 395-e-20.png  
Actual Classification: B  
Predicted Classification: B

---

Image: 396-k-20.png  
Actual Classification: B  
Predicted Classification: B

---

Image: 408-e-26.png  
Actual Classification: A  
Predicted Classification: A

---

Image: 409-k-27.png  
Actual Classification: A  
Predicted Classification: B

---

**Image with Points and Classification: 409-k-27.png**

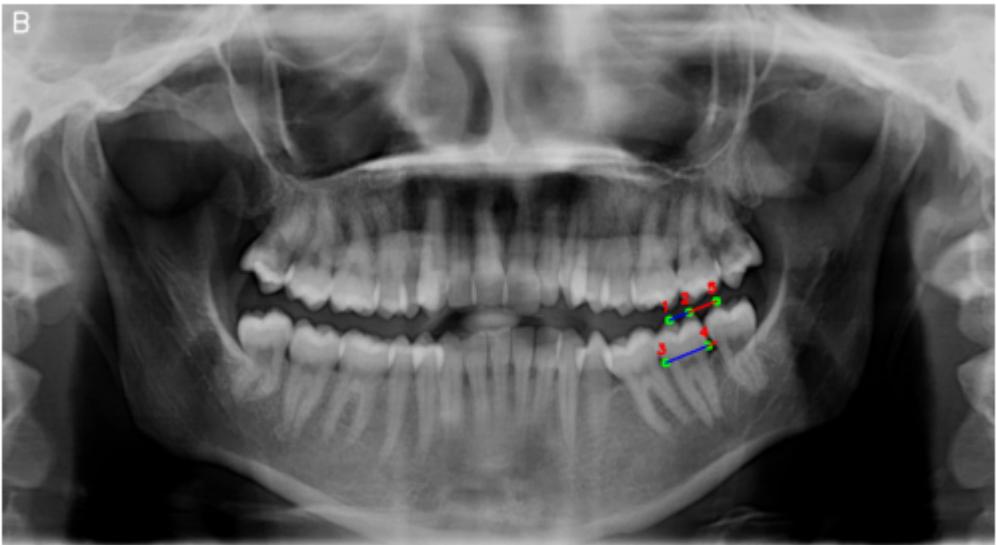


Image: 410-k-25.png

Actual Classification: B

Predicted Classification: B

-----  
Image: 411-k-19.png

Actual Classification: A

Predicted Classification: A

-----  
Image: 413-k-24.png

Actual Classification: A

Predicted Classification: B

**Image with Points and Classification: 413-k-24.png**

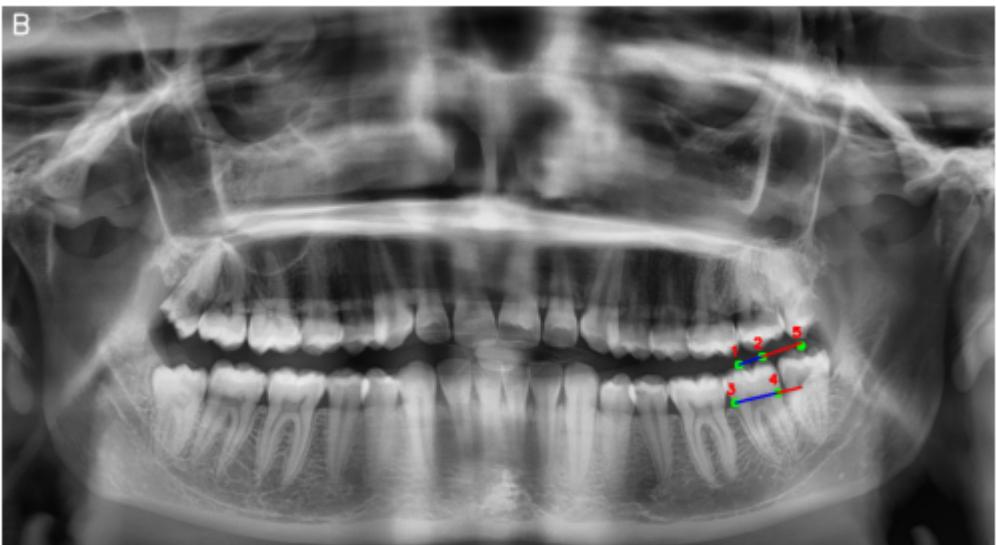


Image: 414-e-38.png

Actual Classification: A

Predicted Classification: A

-----  
Image: 416-k-30.png

Actual Classification: A

Predicted Classification: B

-----

Image with Points and Classification: 416-k-30.png

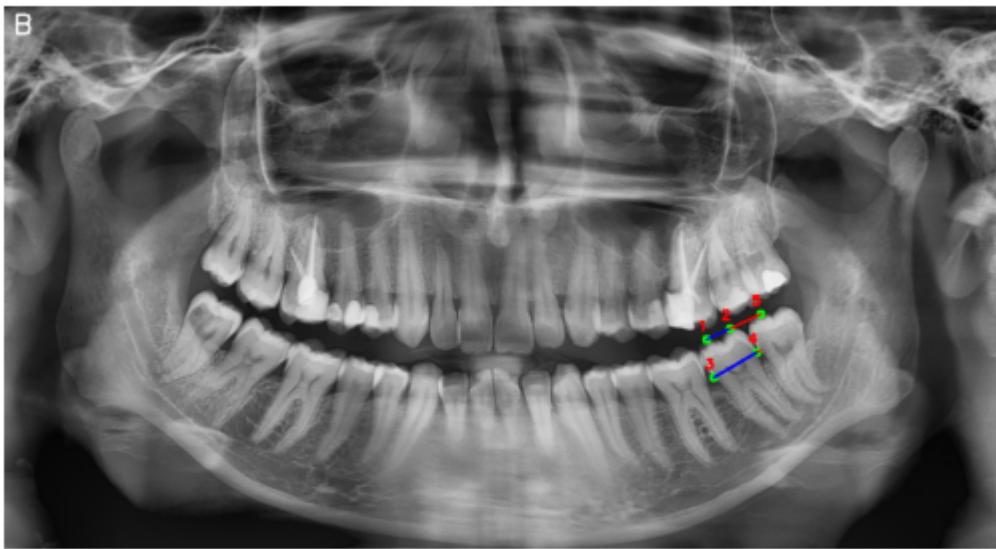


Image: 417-k-30.png

Actual Classification: A

Predicted Classification: B

Image with Points and Classification: 417-k-30.png

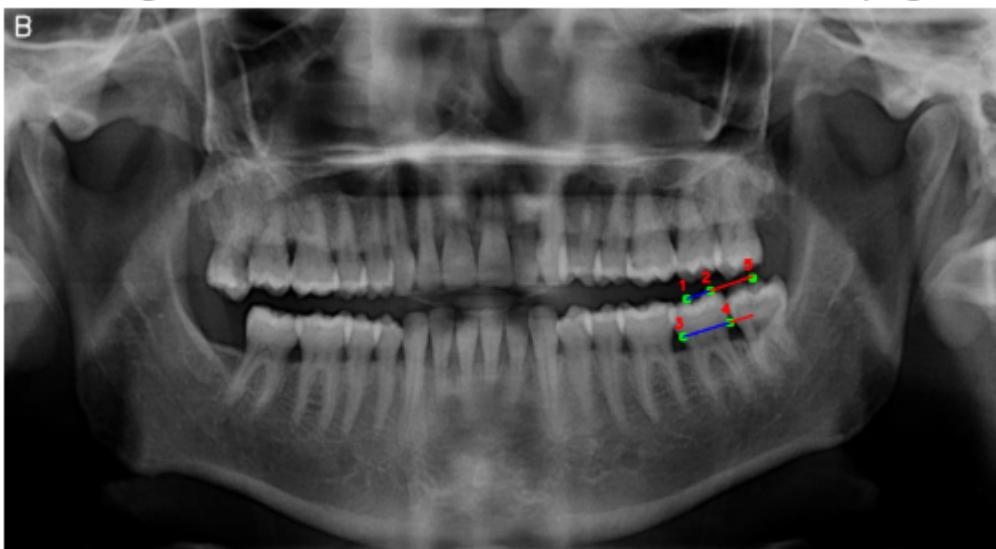


Image: 420-k-21.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 421-e-29.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 422-k-32.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 423-k-17.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 424-k-24.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 425-e-33.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 426-k-18.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 430-k-22.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 431-e-30.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 433-k-21.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 434-k-31.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 435-e-22.png  
Actual Classification: B  
Predicted Classification: B

-----

Image: 435-k-24.png  
Actual Classification: A  
Predicted Classification: A

-----

Image: 50-k-18.png  
Actual Classification: B  
Predicted Classification: A

-----

### Image with Points and Classification: 50-k-18.png

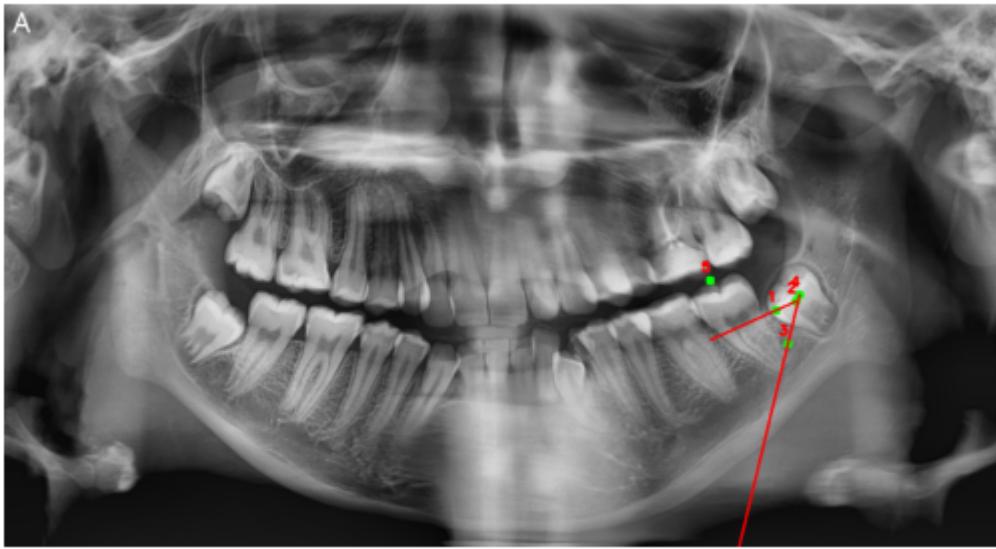


Image: 51-1094-k.png

Actual Classification: B

Predicted Classification: B

-----  
Image: 52-1095-e.png

Actual Classification: B

Predicted Classification: B

-----  
Image: 69-1143-e.png

Actual Classification: B

Predicted Classification: B

-----  
Image: 77-k.png

Actual Classification: A

Predicted Classification: B

### Image with Points and Classification: 77-k.png

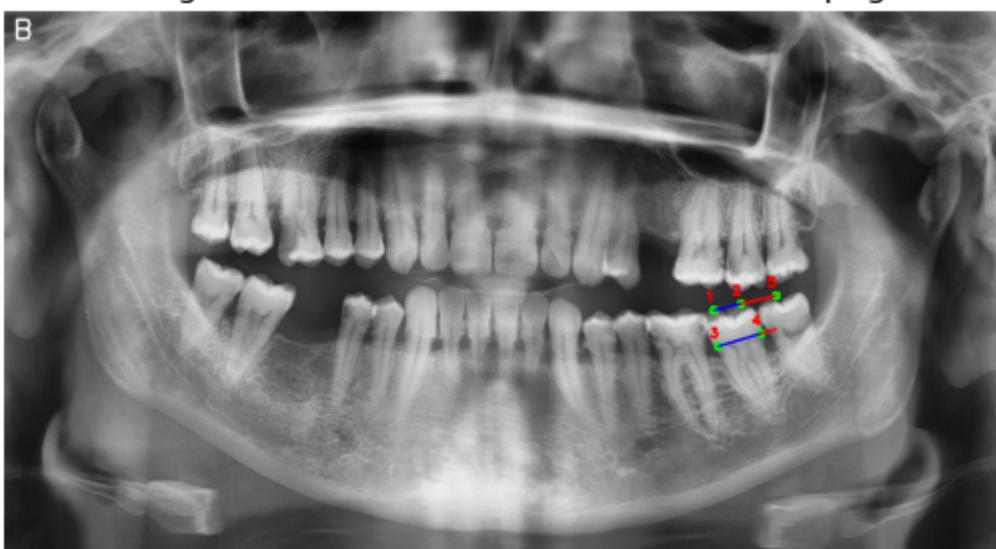


Image: 8-e-31.png

Actual Classification: A

Predicted Classification: B

-----

Image with Points and Classification: 8-e-31.png

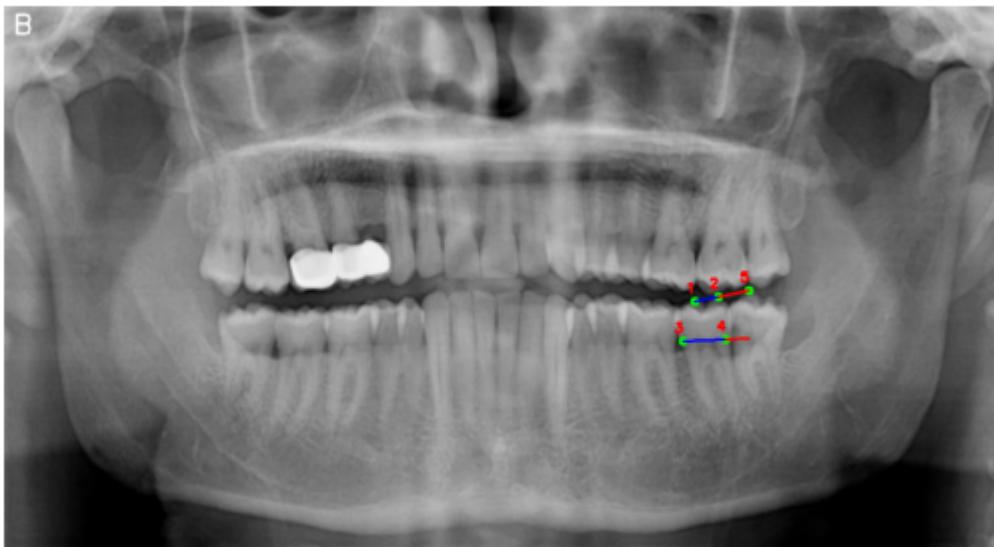


Image: 80-e-27.png

Actual Classification: A

Predicted Classification: B

Image with Points and Classification: 80-e-27.png

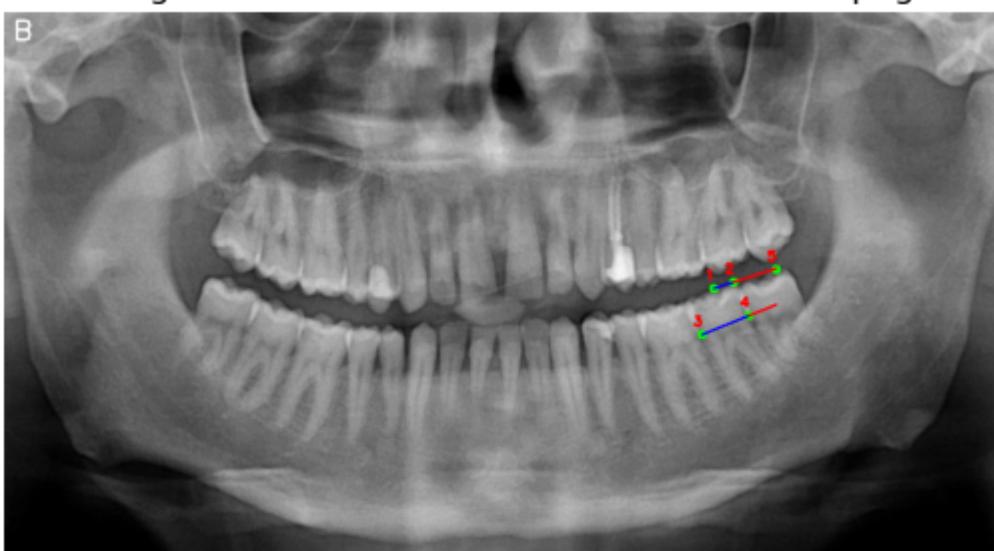


Image: 9-e-30.png

Actual Classification: B

Predicted Classification: C

Image with Points and Classification: 9-e-30.png

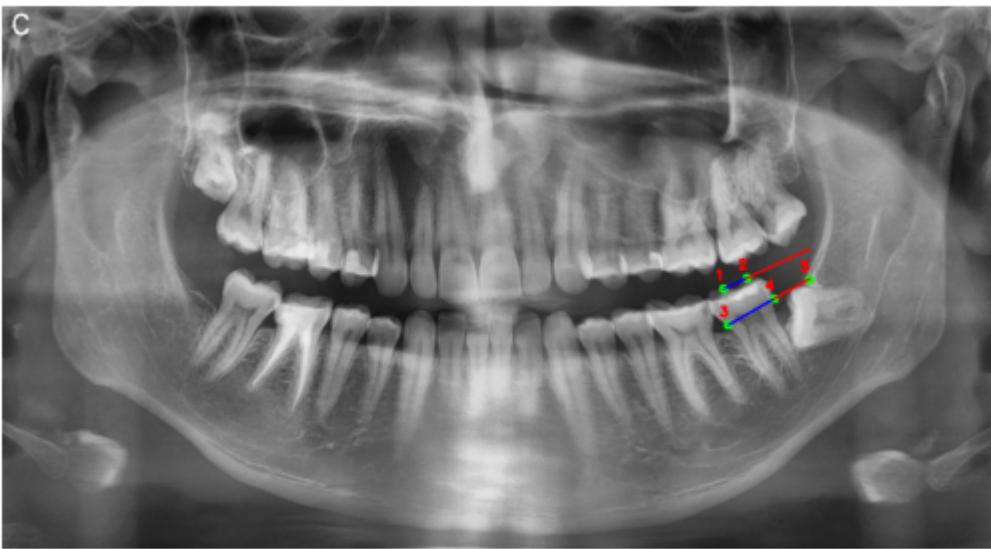


Image: 93-e-30.png

Actual Classification: A

Predicted Classification: A

-----  
Image: 95-k-28.png

Actual Classification: A

Predicted Classification: A

-----  
Accuracy: 0.77% (77/100 correct predictions)

0.77

Out[34]:

```
In [37]: # Function to process images based on classifications in the CSV file
def process_images(coordinates_file, actual_file, image_dir):
    # Read the coordinates file into a DataFrame
    predicted_df = pd.read_csv(coordinates_file)

    # Read the actual classifications file into a dictionary
    actual_classifications = pd.read_csv(actual_file, index_col='NO')[['PG-38']]

    # Initialize variables for correct and wrong predictions
    correct_predictions = 0
    wrong_predictions = 0

    # Iterate over rows in the DataFrame
    for _, row in predicted_df.iterrows():
        # Extract image name and coordinates
        image_name = row['IMAGE']
        coordinates = [(row[f'{i}-X'], row[f'{i}-Y']) for i in range(1, 6)]

        # Determine classification based on coordinates
        predicted_classification = determine_classification(*sum(coordinates,

        # Compare with actual classification
        actual_classification = actual_classifications.get(image_name, 'N/A')

        # Print information for each row
        print(f"Image: {image_name}.png")
        print(f"Expert Classification: {actual_classification}")
        print(f"Predicted Classification: {predicted_classification}")
        print("-" * 30)
```

```

# Check if the predicted classification matches the actual classification
if actual_classification != 'N/A' and predicted_classification == actual_classification:
    correct_predictions += 1
else:
    image = image_name + '.png'
    plot_image_with_coordinates_from_csv(coordinates_file, image_dir,
    wrong_predictions += 1

# Calculate classification accuracy
total_images = len(predicted_df)
accuracy = correct_predictions / total_images if total_images > 0 else 0
print(f"Accuracy 37-38-PG: {accuracy:.2f}% ({correct_predictions}/{total_images})")

```

In [39]:

```

csv_file = "../data/dataset/annotations/classifications/37-38-PG.csv"
coordinates_file = "../data/dataset/annotations/37-38-PELLGREGORY.csv"
image_dir = '../data/dataset/images/png/images'

# Call the function to process images
process_images(coordinates_file, actual_file, image_dir)

```

Image: 408-e-26.png  
 Expert Classification: A  
 Predicted Classification: A

---

Image: 410-k-25.png  
 Expert Classification: B  
 Predicted Classification: B

---

Image: 411-k-19.png  
 Expert Classification: A  
 Predicted Classification: A

---

Image: 413-k-24.png  
 Expert Classification: A  
 Predicted Classification: B

---

Image with Points and Classification: 413-k-24.png

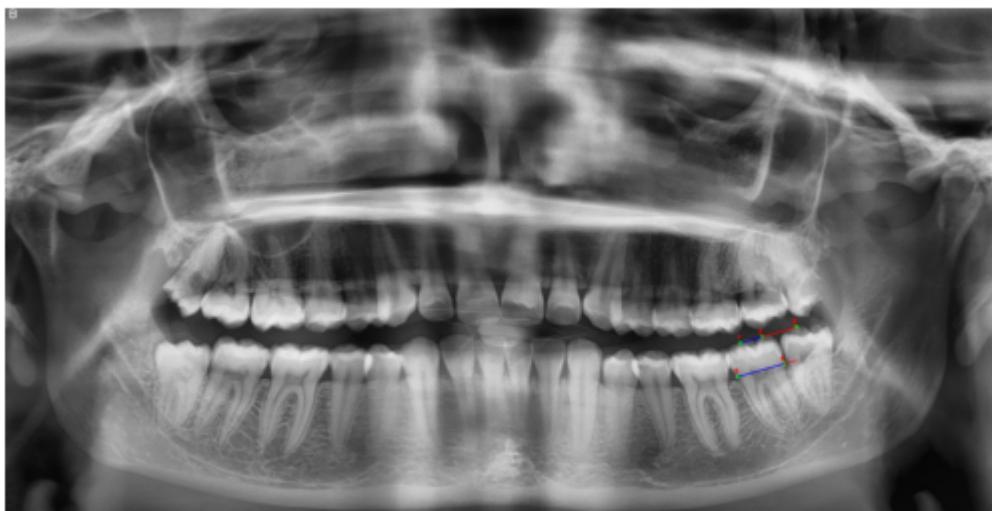


Image: 414-e-38.png

Expert Classification: A

Predicted Classification: A

-----  
Image: 416-k-30.png

Expert Classification: A

Predicted Classification: B

-----  
Image with Points and Classification: 416-k-30.png

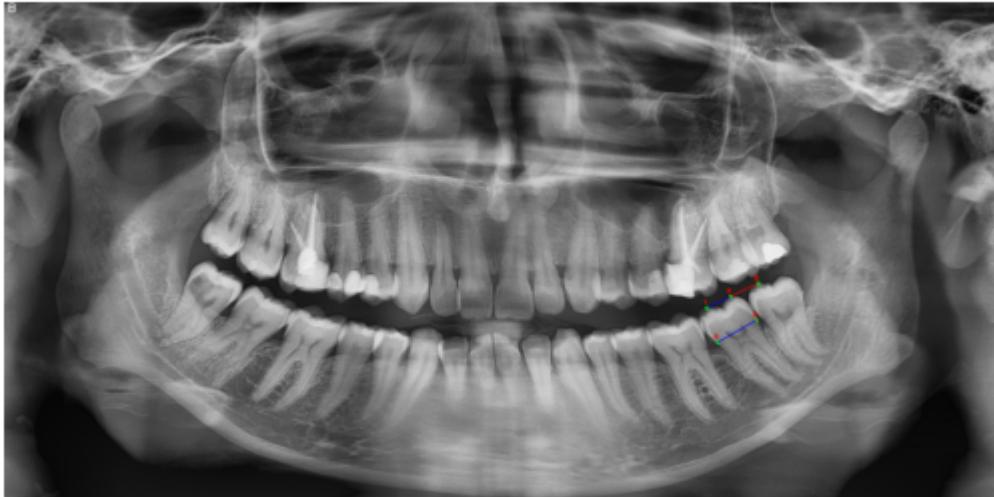


Image: 423-k-17.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 426-k-18.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 430-k-22.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 431-e-30.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 433-k-21.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 438-k-23.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 441-k-19.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 442-e-23.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 443-k-19.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 446-e-34.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 447-k-25.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 452-k-19.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 464-e-31.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 465-e-33.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 469-e-32.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 470-e-30.png

Expert Classification: A

Predicted Classification: B

-----

Image with Points and Classification: 470-e-30.png

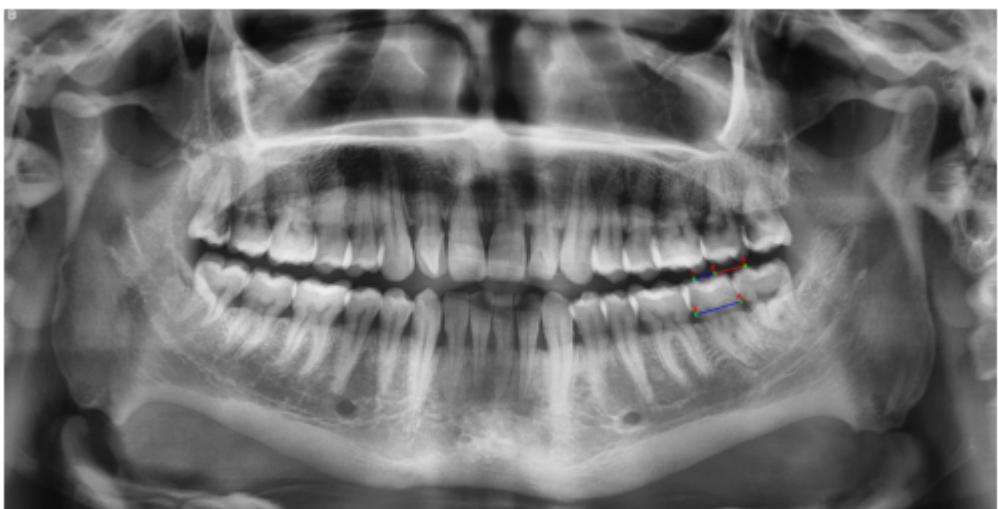


Image: 625-k-36.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 685-e-45.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 767-k-20.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 775-k-37.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 781-k-20.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 782-e-19.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 792-k-24.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 800-e-23.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 805-k-19.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 811-e-28.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 830-k-24.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 837-e-24.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 838-e-23.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 840-k-23.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 841-k-22.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 846-k-23.png

Expert Classification: A

Predicted Classification: B

-----

Image with Points and Classification: 846-k-23.png

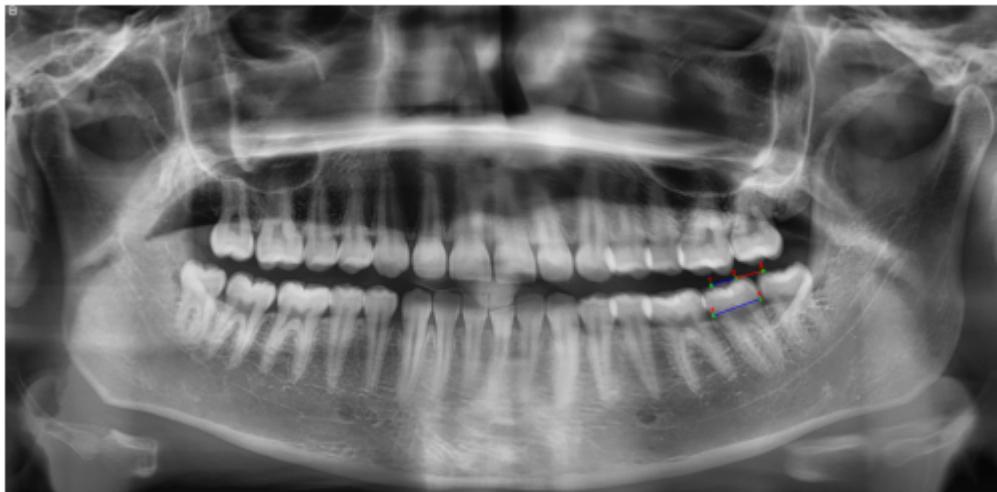


Image: 851-e-34.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 855-k-22.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 858-e-21.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 859-e-22.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 863-e-23.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 878-k-29.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 880-k-21.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 892-k-26.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 50-k-18.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 220-k-22.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 658-e-22.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 759-18-k.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 1380.png  
Expert Classification: C  
Predicted Classification: C

-----

Image: 1534-16-k.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 1542.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 1577-16-k.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 1589-23-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 1595-25-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 1778-20-k.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 1826-44-k.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 1838-21-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 119770-e.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 143-681-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 181044-e.png  
Expert Classification: C  
Predicted Classification: C

-----

Image: 248784-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 276381-k.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 285381-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 351888-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 364222-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 449052-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 451275.png  
Expert Classification: C  
Predicted Classification: C

-----

Image: 449664.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 498224.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 600970-k.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 606374-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 615130.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 1-e-27.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 8-e-31.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 11-e-29.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 15-e-22.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 21-k-25.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 22-e-33.png  
Expert Classification: A  
Predicted Classification: B

-----

Image with Points and Classification: 22-e-33.png

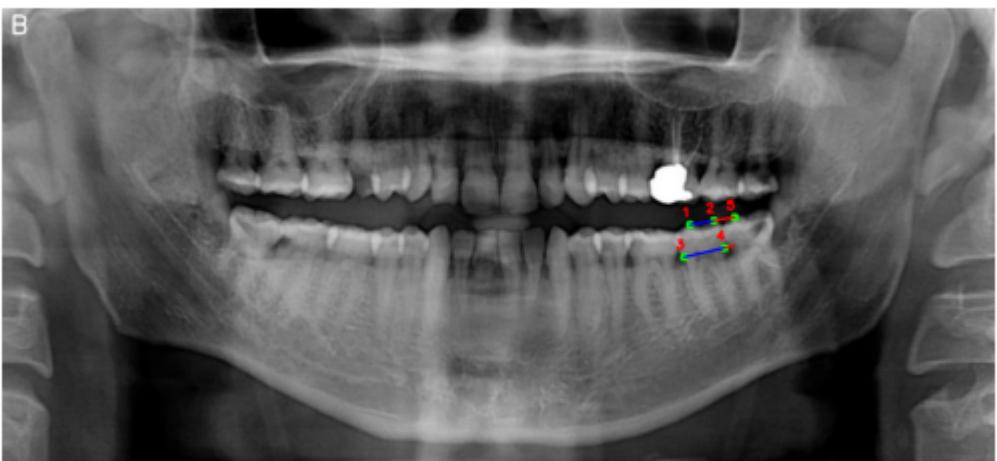


Image: 24-e-21.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 27-k-33.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 28-k-22.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 29-e-22.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 30-31-52.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 30-e-28.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 51-1094-k.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 52-1095-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 69-1143-e.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 80-e-27.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 93-e-30.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 95-k-28.png  
Expert Classification: A  
Predicted Classification: B

-----

Image with Points and Classification: 95-k-28.png

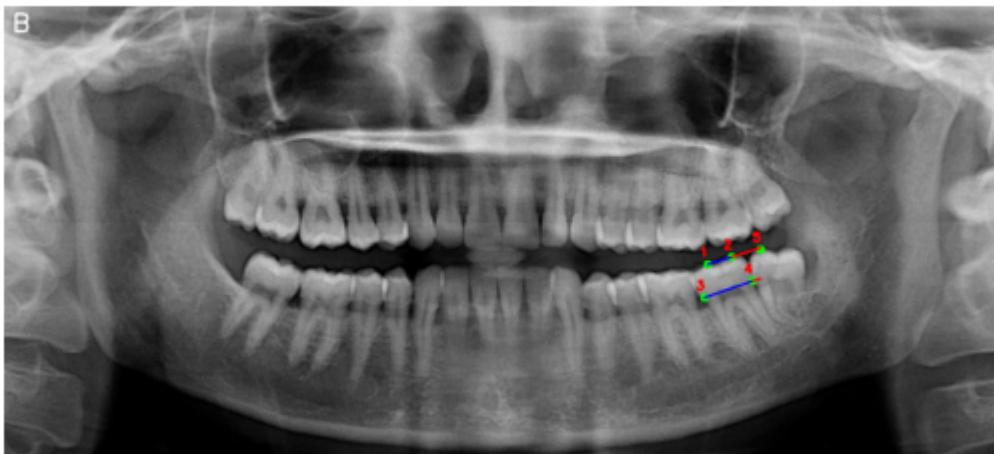


Image: 117-118-e.png

Expert Classification: B

Predicted Classification: C

---

Image with Points and Classification: 117-118-e.png

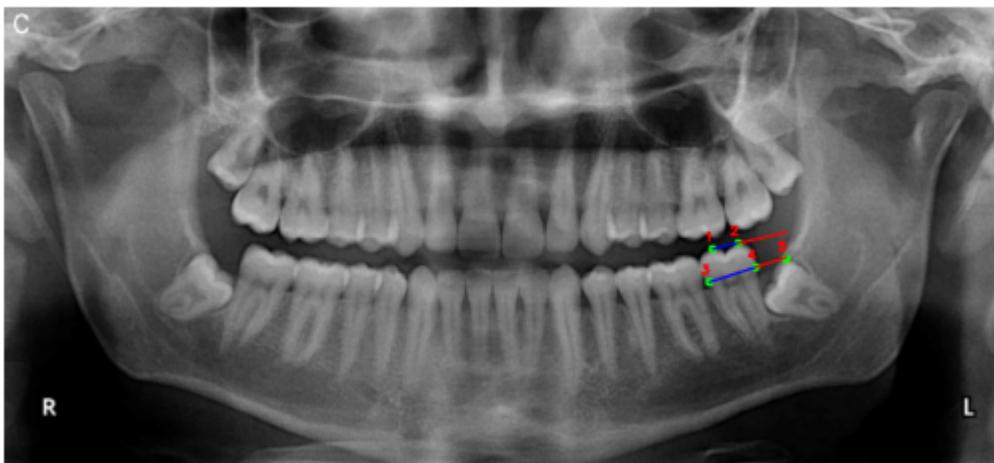


Image: 131-126-k.png

Expert Classification: B

Predicted Classification: B

---

Image: 137-k.png

Expert Classification: A

Predicted Classification: B

---

### Image with Points and Classification: 137-k.png

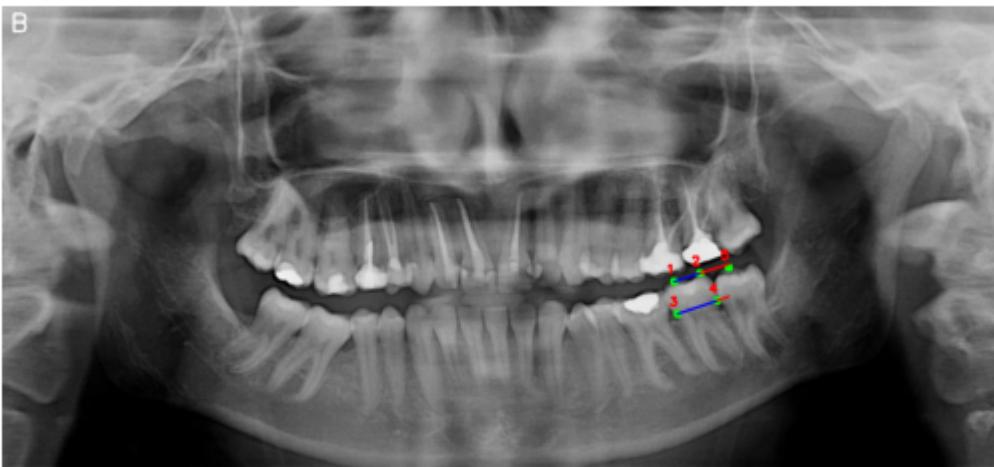


Image: 139-140.png

Expert Classification: B

Predicted Classification: B

-----  
Image: 139-k.png

Expert Classification: A

Predicted Classification: A

-----  
Image: 140-k.png

Expert Classification: A

Predicted Classification: B

### Image with Points and Classification: 140-k.png

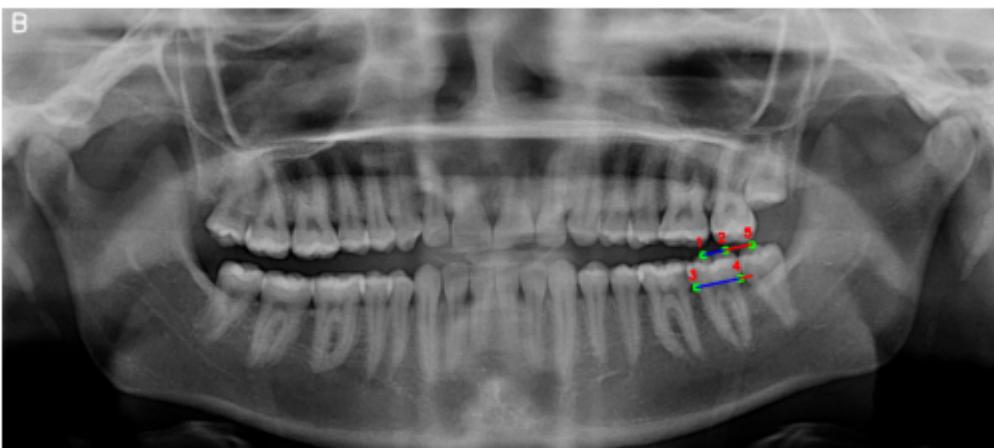


Image: 142-k.png

Expert Classification: A

Predicted Classification: B

-----

Image with Points and Classification: 142-k.png

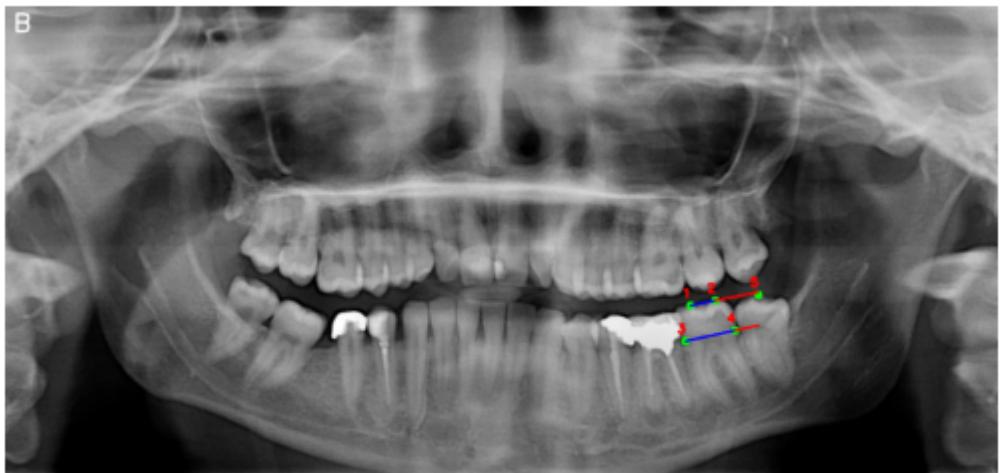


Image: 147-k.png

Expert Classification: C

Predicted Classification: C

-----  
Image: 149-e.png

Expert Classification: A

Predicted Classification: C

-----  
Image with Points and Classification: 149-e.png

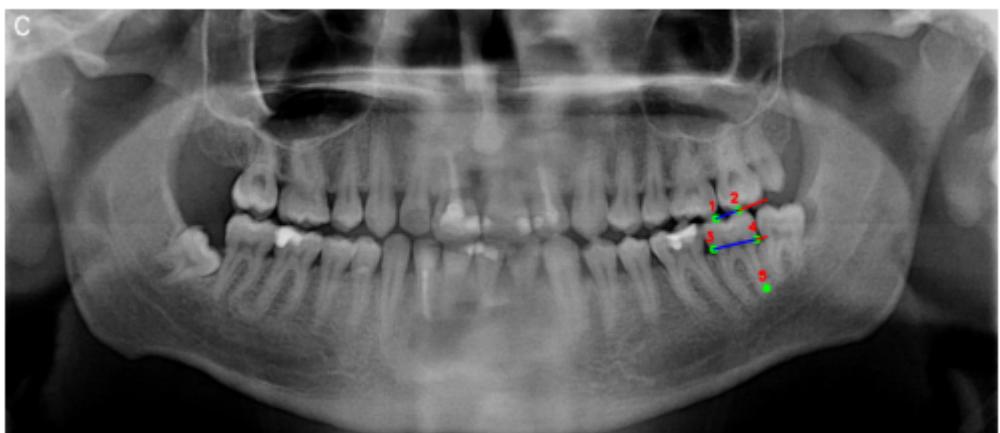


Image: 152-k.png  
Expert Classification: A  
Predicted Classification: A

---

Image: 154-132-k.png  
Expert Classification: B  
Predicted Classification: B

---

Image: 162-134-e.png  
Expert Classification: C  
Predicted Classification: C

---

Image: 165-135-k.png  
Expert Classification: B  
Predicted Classification: B

---

Image: 170-k-23.png  
Expert Classification: A  
Predicted Classification: B

---

**Image with Points and Classification: 170-k-23.png**

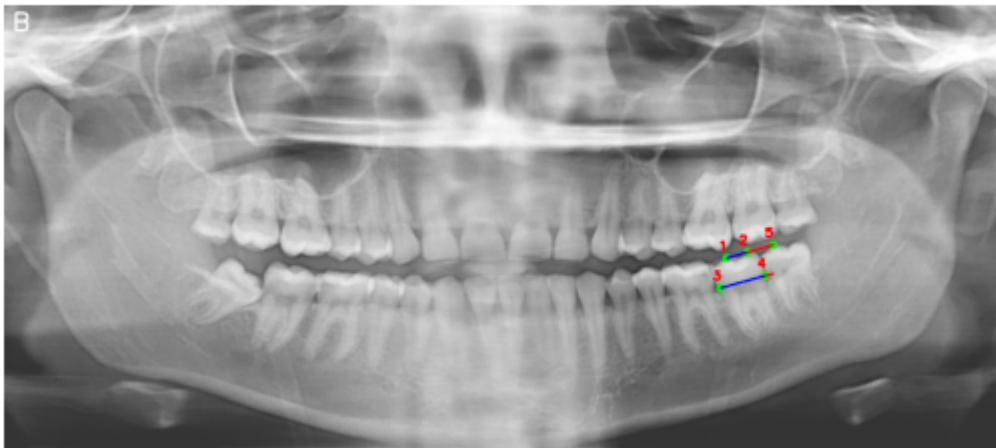


Image: 171-k-20.png  
Expert Classification: A  
Predicted Classification: B

---

**Image with Points and Classification: 171-k-20.png**

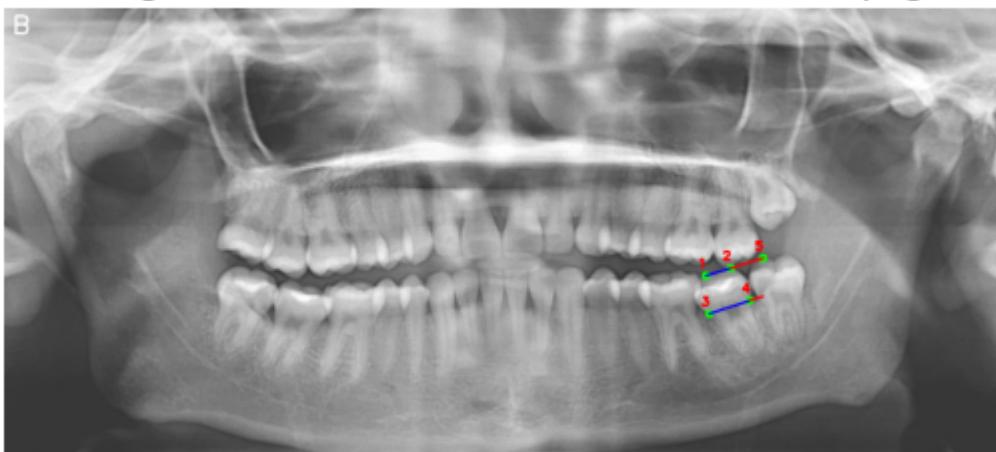


Image: 173-k-21.png  
Expert Classification: A  
Predicted Classification: A

---

Image: 175-k-52.png  
Expert Classification: A  
Predicted Classification: A

---

Image: 178-e-29.png  
Expert Classification: A  
Predicted Classification: A

---

Image: 181-e-32.png  
Expert Classification: B  
Predicted Classification: B

---

Image: 185-k-31.png  
Expert Classification: A  
Predicted Classification: A

---

Image: 186-e-21.png  
Expert Classification: B  
Predicted Classification: A

---

### Image with Points and Classification: 186-e-21.png

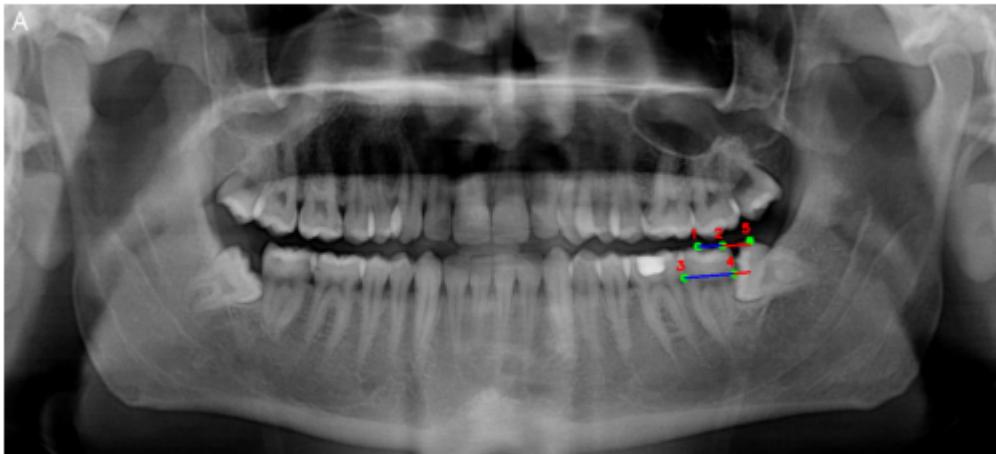


Image: 193-e-39.png  
Expert Classification: A  
Predicted Classification: B

---

Image with Points and Classification: 193-e-39.png

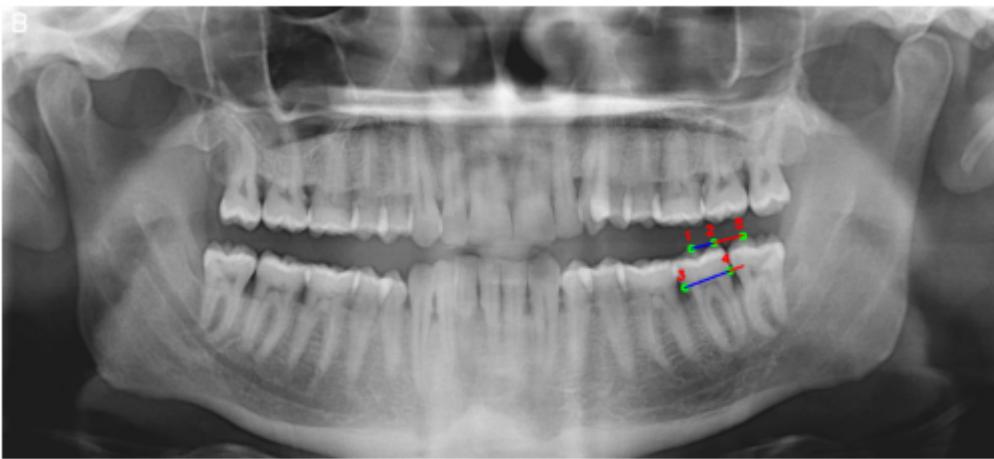


Image: 198-k-20.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 226-e-30.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 249-e-25.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 265-e-21.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 277-e-17.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 315-e-21.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 343-344.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 353-e-20.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 354-k-18.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 357-k-20.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 361-e-28.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 362-e-40.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 364-k-37.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 365-e-25.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 367-k-18.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 372-k-16.png

Expert Classification: B

Predicted Classification: B

-----  
Image: 375-k-23.png

Expert Classification: B

Predicted Classification: B

-----  
Image: 376-k-18.png

Expert Classification: A

Predicted Classification: A

-----  
Image: 378-e-23.png

Expert Classification: B

Predicted Classification: B

-----  
Image: 385-e-24.png

Expert Classification: B

Predicted Classification: B

-----  
Image: 387-e-24.png

Expert Classification: A

Predicted Classification: A

-----  
Image: 389-e-21.png

Expert Classification: B

Predicted Classification: B

-----  
Image: 391-k-20.png

Expert Classification: A

Predicted Classification: B

-----  
**Image with Points and Classification: 391-k-20.png**

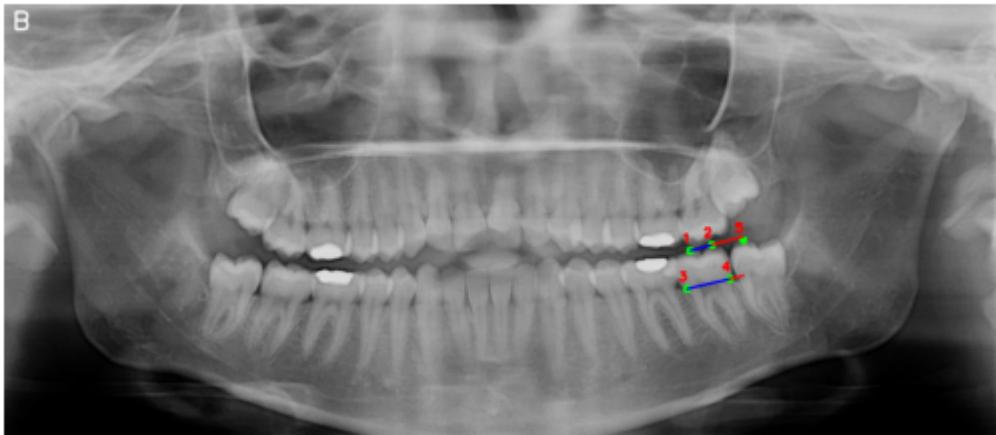


Image: 392-e-23.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 395-e-20.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: 409-k-27.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 417-k-30.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 420-k-21.png  
Expert Classification: B  
Predicted Classification: B

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Image: 421-e-29.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 422-k-32.png  
Expert Classification: A  
Predicted Classification: A

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Image: 424-k-24.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 425-e-33.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 434-k-31.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 435-e-22.png  
Expert Classification: B  
Predicted Classification: B

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Image: 435-k-24.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 436-k-25.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: 439-k-22.png  
Expert Classification: B  
Predicted Classification: B

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Image: 444-k-22.png  
Expert Classification: A  
Predicted Classification: A

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Image: 445-k-20.png  
Expert Classification: A  
Predicted Classification: A

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Image: 455-e-20.png  
Expert Classification: B  
Predicted Classification: B

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Image: 456-k-35.png  
Expert Classification: A  
Predicted Classification: A

---

Image: 457-e-22.png  
Expert Classification: A  
Predicted Classification: B

---

**Image with Points and Classification: 457-e-22.png**

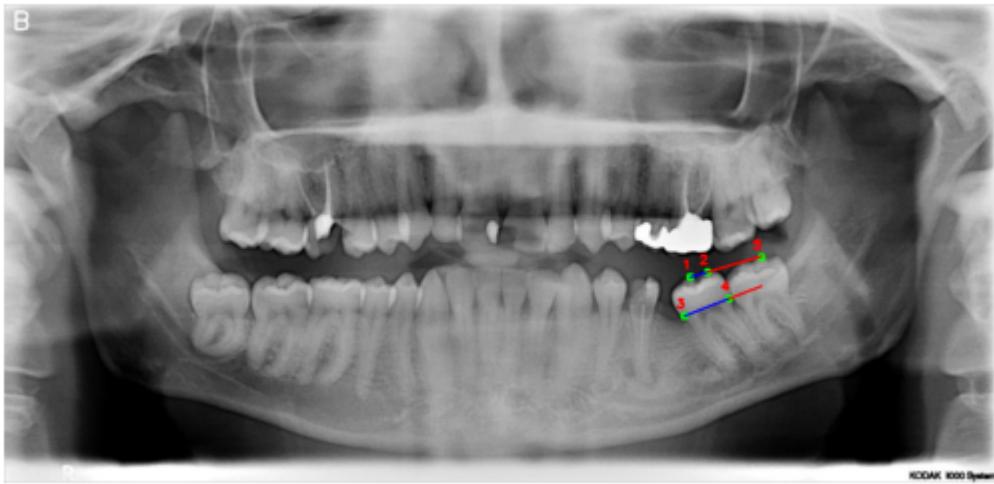


Image: 463-k-32.png  
Expert Classification: B  
Predicted Classification: B

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Image: 467-e-20.png  
Expert Classification: B  
Predicted Classification: B

---

Image: 471-k-24.png  
Expert Classification: B  
Predicted Classification: B

---

Image: 472-e-20.png  
Expert Classification: A  
Predicted Classification: B

---

Image with Points and Classification: 472-e-20.png

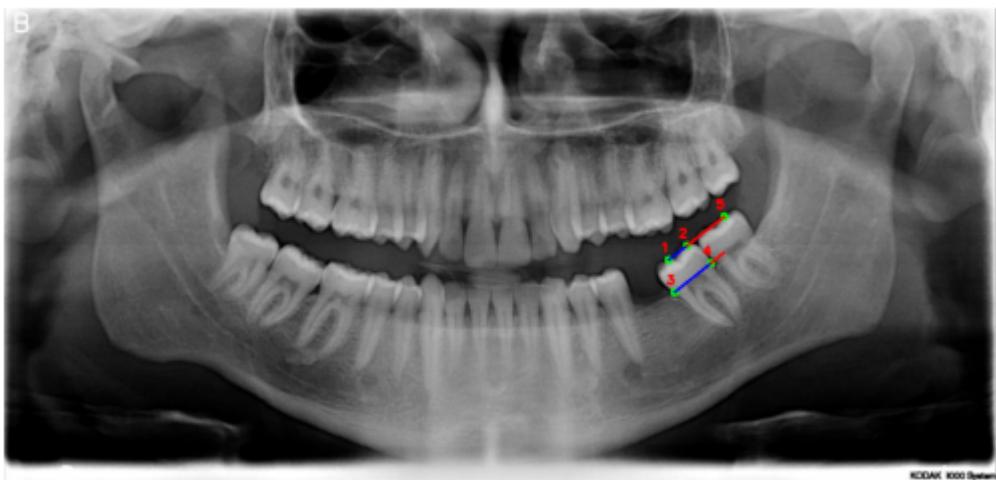


Image: 487-e-22.png

Expert Classification: B

Predicted Classification: B

-----  
Image: 491-k-20.png

Expert Classification: B

Predicted Classification: A

-----  
Image with Points and Classification: 491-k-20.png

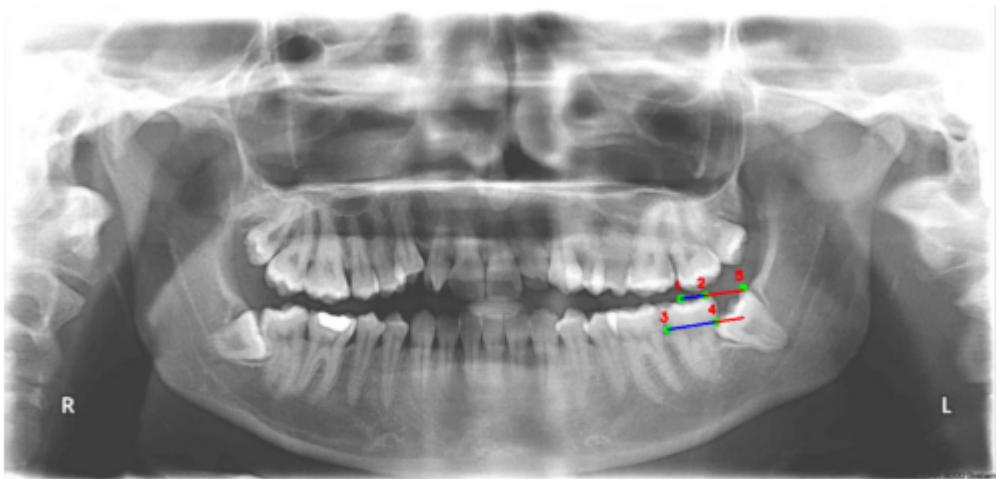


Image: 554-k-21.png  
Expert Classification: B  
Predicted Classification: B

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Image: 583-e-21.png  
Expert Classification: B  
Predicted Classification: B

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Image: 586-e-23.png  
Expert Classification: B  
Predicted Classification: B

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Image: 588-e-20.png  
Expert Classification: B  
Predicted Classification: B

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Image: 591-e-25.png  
Expert Classification: B  
Predicted Classification: B

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Image: 592-e-24.png  
Expert Classification: B  
Predicted Classification: B

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Image: 602-e-22.png  
Expert Classification: B  
Predicted Classification: B

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Image: 604-e-26.png  
Expert Classification: B  
Predicted Classification: B

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Image: 608-e-24.png  
Expert Classification: B  
Predicted Classification: B

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Image: 610-e-20.png  
Expert Classification: C  
Predicted Classification: B

-----

Image with Points and Classification: 610-e-20.png

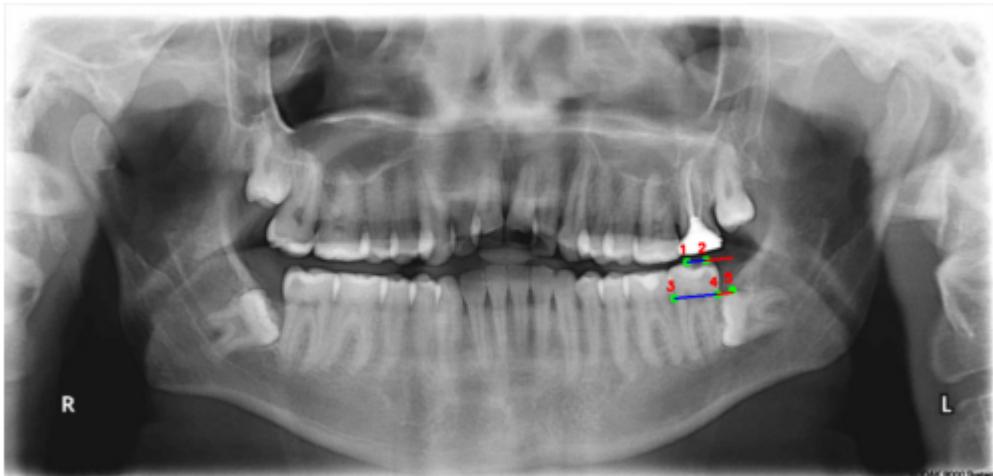


Image: 612-e-22.png  
Expert Classification: B  
Predicted Classification: B

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Image: 614-e-22.png  
Expert Classification: B  
Predicted Classification: B

---

Image: 660-e-27.png  
Expert Classification: A  
Predicted Classification: A

---

Image: 665-e-30.png  
Expert Classification: A  
Predicted Classification: A

---

Image: 667-k-28.png  
Expert Classification: A  
Predicted Classification: B

---

### Image with Points and Classification: 667-k-28.png

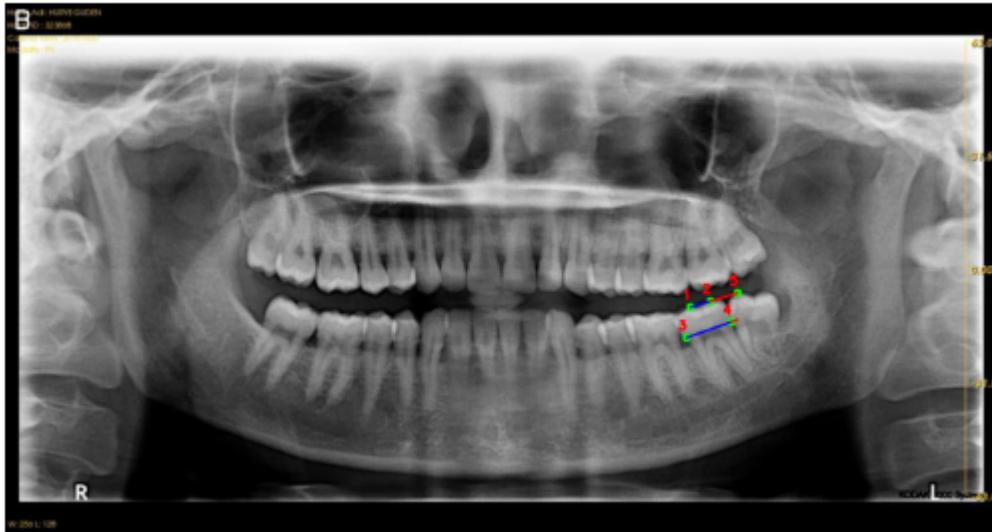


Image: 690-e-21.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-1.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-2.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-3.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-4.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-5.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-6.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-7.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-8.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-9.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-10.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-11.png  
Expert Classification: A  
Predicted Classification: B

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Image with Points and Classification: son-11.png

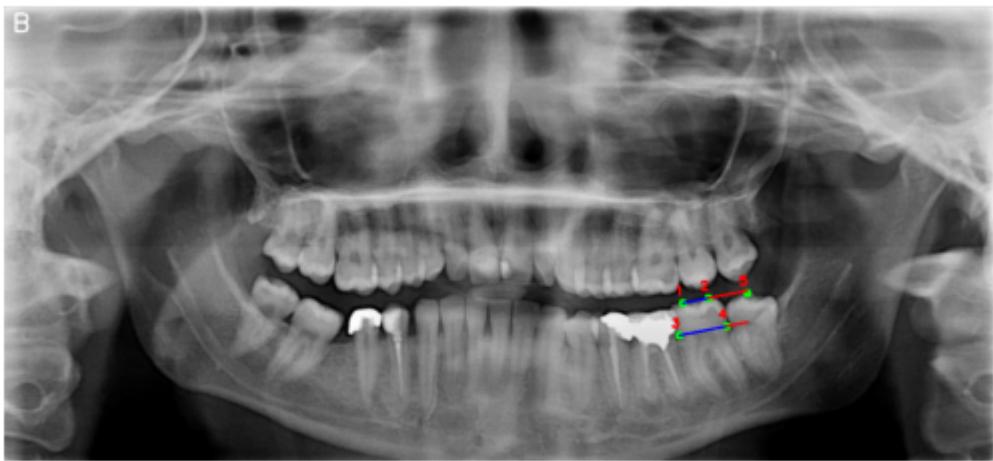


Image: son-12.png  
Expert Classification: C  
Predicted Classification: C

-----

Image: son-13.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-14.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-15.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-16.png  
Expert Classification: C  
Predicted Classification: C

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Image: son-17.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-18.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-19.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-20.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-21.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: son-22.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: son-23.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-24.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-25.png  
Expert Classification: A  
Predicted Classification: B

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Image with Points and Classification: son-25.png

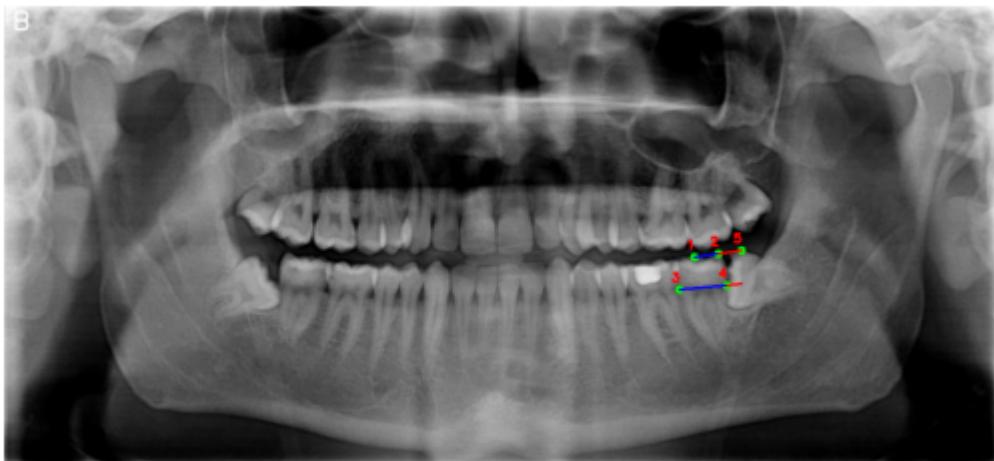


Image: son-27.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-28.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-31.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-32.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-33.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-35.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-36.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-37.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-38.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-39.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-40.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-41.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-42.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-43.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-44.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-45.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-46.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-47.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-48.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-49.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-50.png  
Expert Classification: C  
Predicted Classification: C

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Image: son-51.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-52.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-53.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-54.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-55.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-56.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-57.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-58.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-59.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-60.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-61.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-62.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-63.png  
Expert Classification: A  
Predicted Classification: B

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Image with Points and Classification: son-63.png

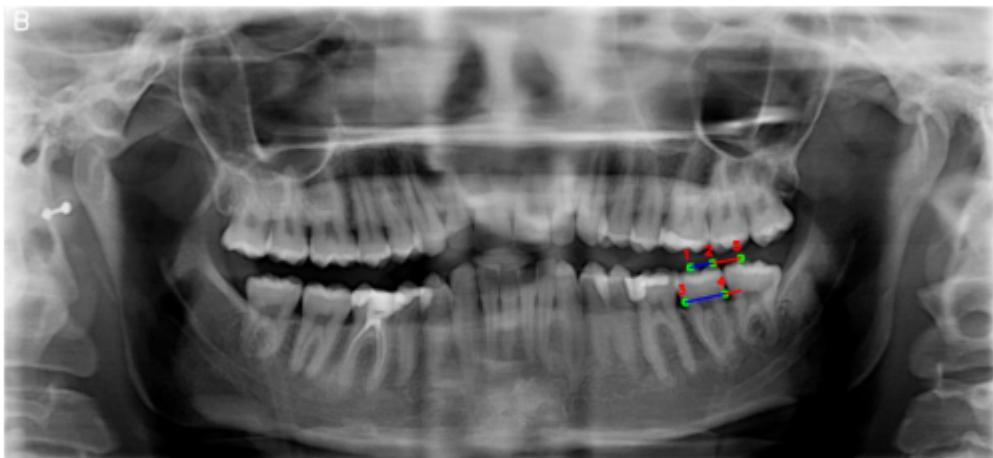


Image: son-64.png  
Expert Classification: A  
Predicted Classification: A

---

Image: son-65.png  
Expert Classification: A  
Predicted Classification: B

---

Image with Points and Classification: son-65.png

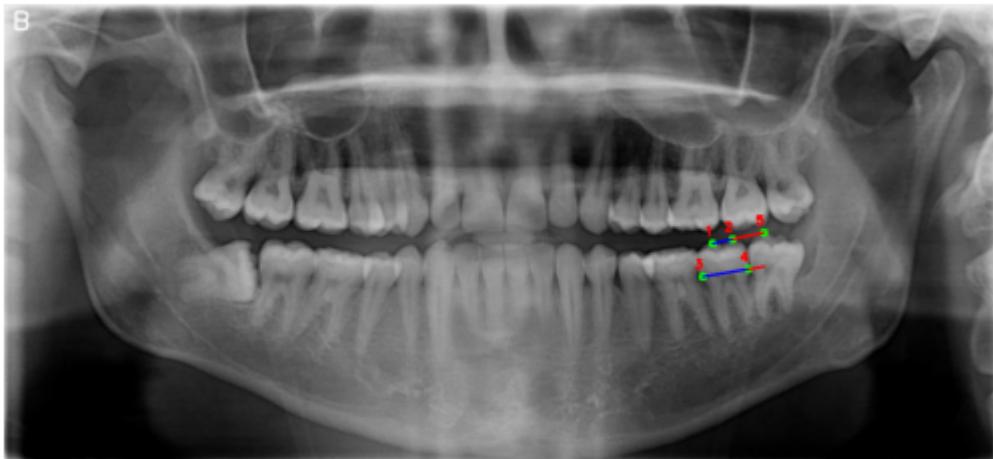


Image: son-66.png  
Expert Classification: A  
Predicted Classification: B

---

Image with Points and Classification: son-66.png

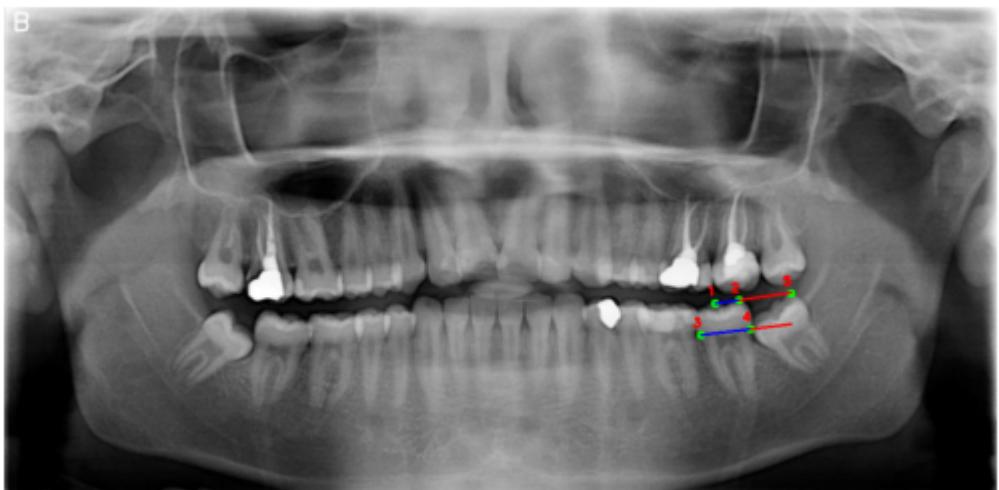


Image: son-67.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-68.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-70.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-71.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-72.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-73.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-74.png  
Expert Classification: A  
Predicted Classification: B

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### Image with Points and Classification: son-74.png

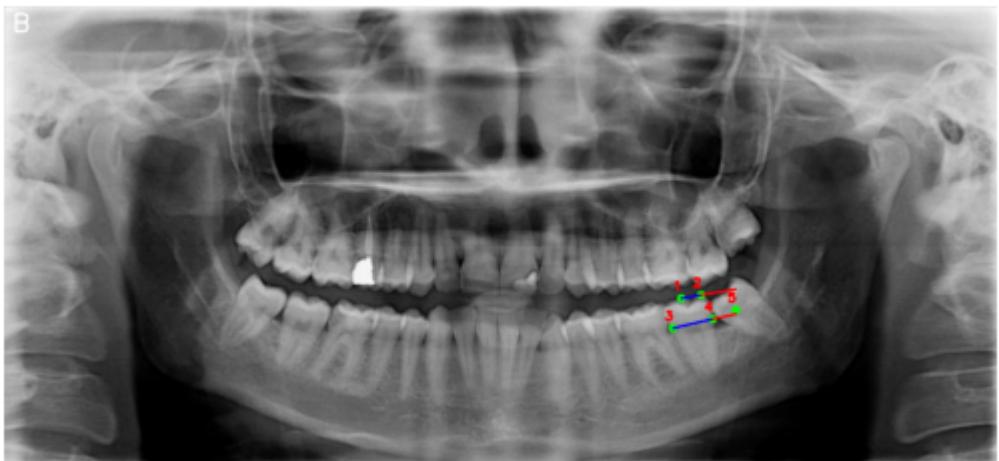


Image: son-75.png

Expert Classification: B

Predicted Classification: B

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Image: son-75.png

Expert Classification: B

Predicted Classification: B

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Image: son-76.png

Expert Classification: B

Predicted Classification: B

-----  
Image: son-77.png

Expert Classification: B

Predicted Classification: B

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Image: son-78.png

Expert Classification: A

Predicted Classification: B

### Image with Points and Classification: son-78.png

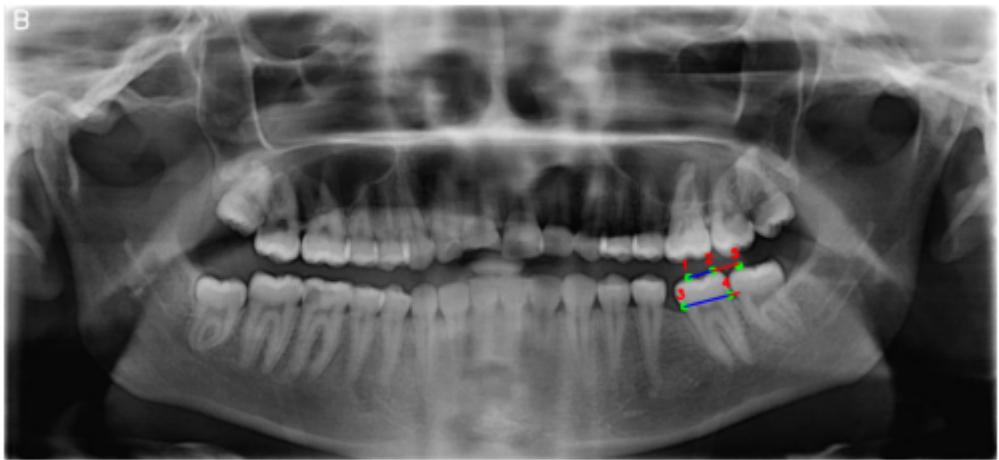


Image: son-79.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-80.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-81.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-82.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-84.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-85.png  
Expert Classification: A  
Predicted Classification: B

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**Image with Points and Classification: son-85.png**

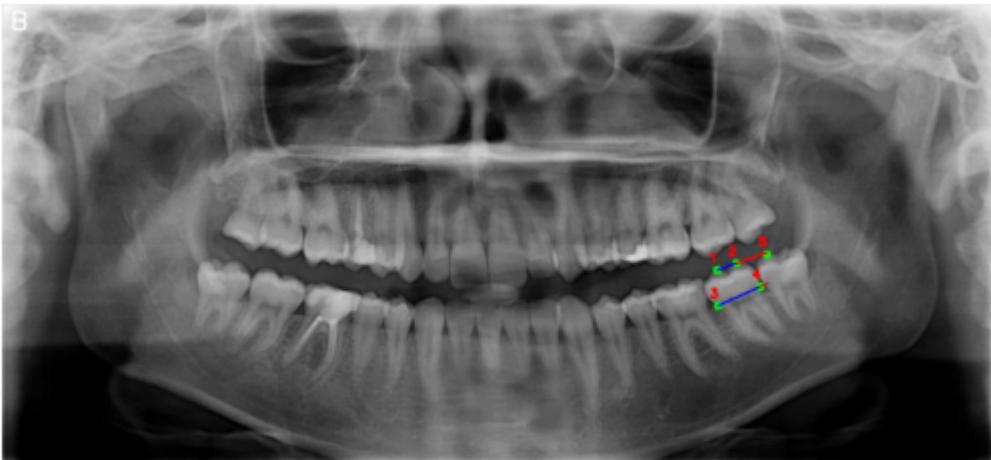


Image: son-86.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-87.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-88.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-89.png  
Expert Classification: A  
Predicted Classification: B

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Image with Points and Classification: son-89.png

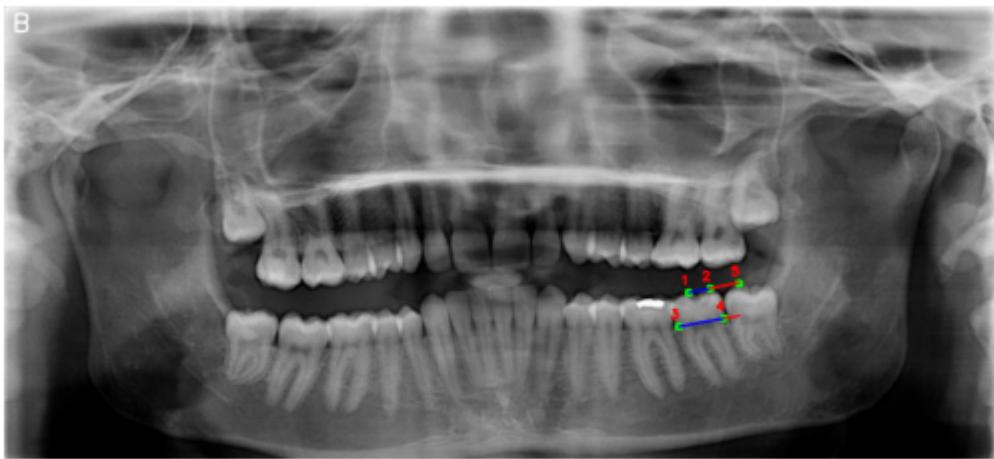


Image: son-90.png

Expert Classification: B

Predicted Classification: B

-----  
Image: son-90.png

Expert Classification: A

Predicted Classification: B

Image with Points and Classification: son-91.png

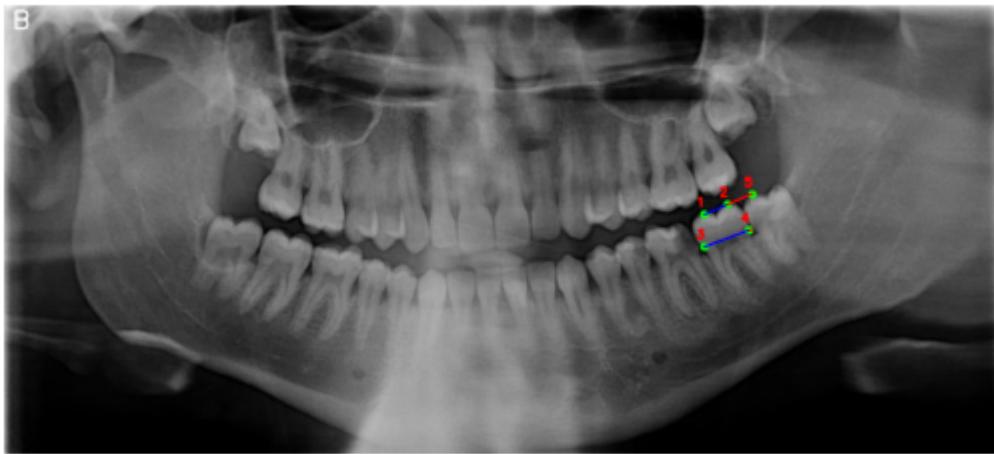


Image: son-94.png

Expert Classification: C

Predicted Classification: B

-----

Image with Points and Classification: son-94.png

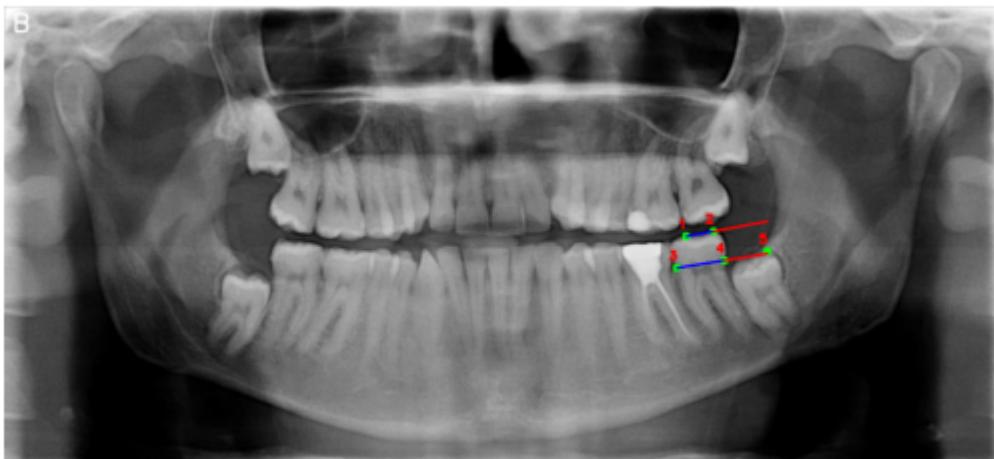


Image: son-95.png

Expert Classification: B

Predicted Classification: B

-----  
Image: son-95.png

Expert Classification: A

Predicted Classification: A

-----  
Image: son-97.png

Expert Classification: B

Predicted Classification: B

-----  
Image: son-98.png

Expert Classification: A

Predicted Classification: B

-----  
Image with Points and Classification: son-98.png

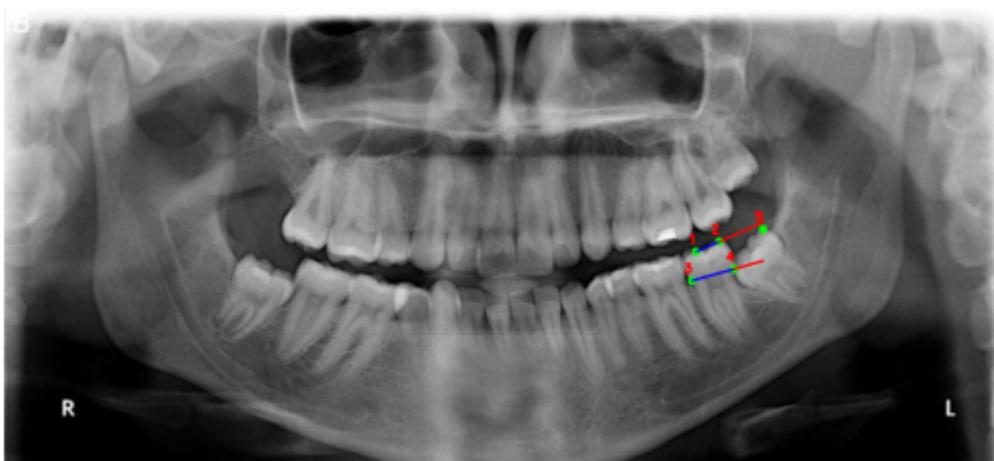


Image: son-99.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-100.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-101.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-102.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-103.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-104.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-105.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-106.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-107.png  
Expert Classification: A  
Predicted Classification: B

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Image with Points and Classification: son-107.png

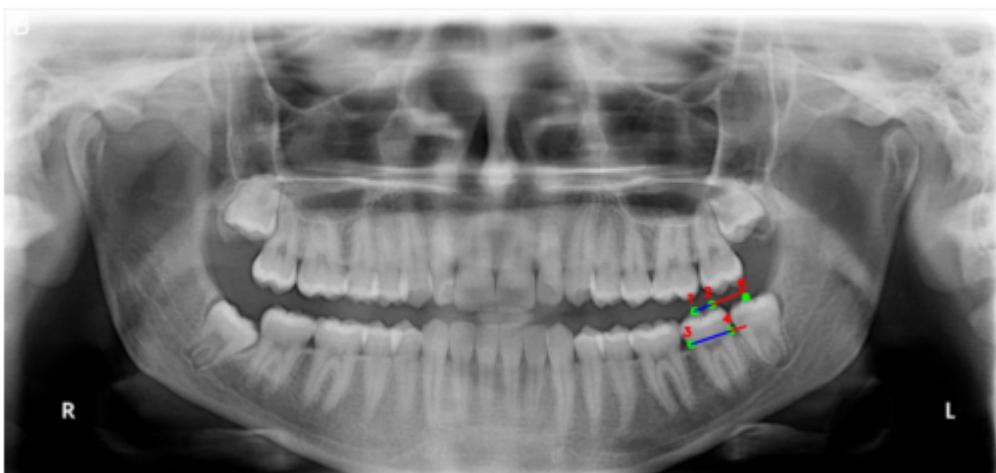


Image: son-108.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-109.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-110.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-111.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-112.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-113.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-114.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-115.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-116.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-117.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-118.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-119.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-120.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-121.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-122.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-123.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-124.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-125.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-126.png  
Expert Classification: A  
Predicted Classification: B

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**Image with Points and Classification: son-126.png**

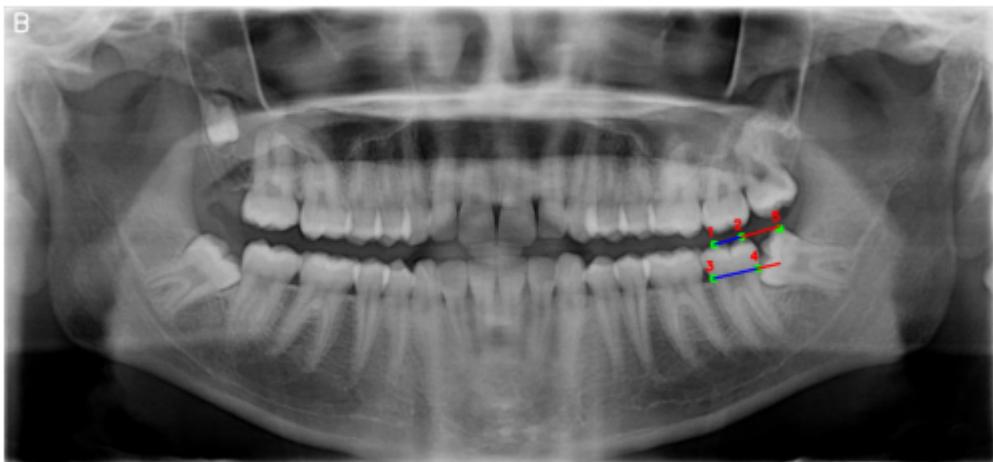


Image: son-127.png  
Expert Classification: B  
Predicted Classification: A

---

**Image with Points and Classification: son-127.png**

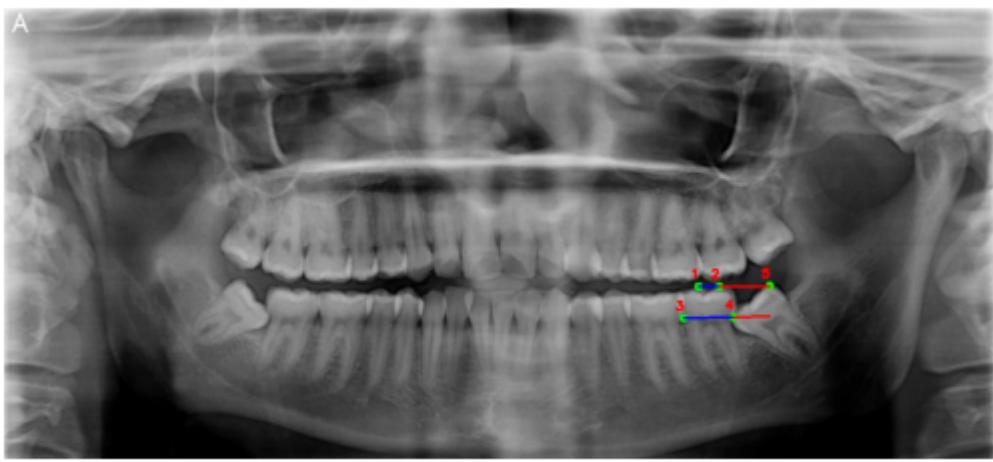


Image: son-128.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-129.png  
Expert Classification: B  
Predicted Classification: B

---

Image: son-130.png  
Expert Classification: B  
Predicted Classification: B

---

Image: son-131.png  
Expert Classification: A  
Predicted Classification: B

---

Image with Points and Classification: son-131.png

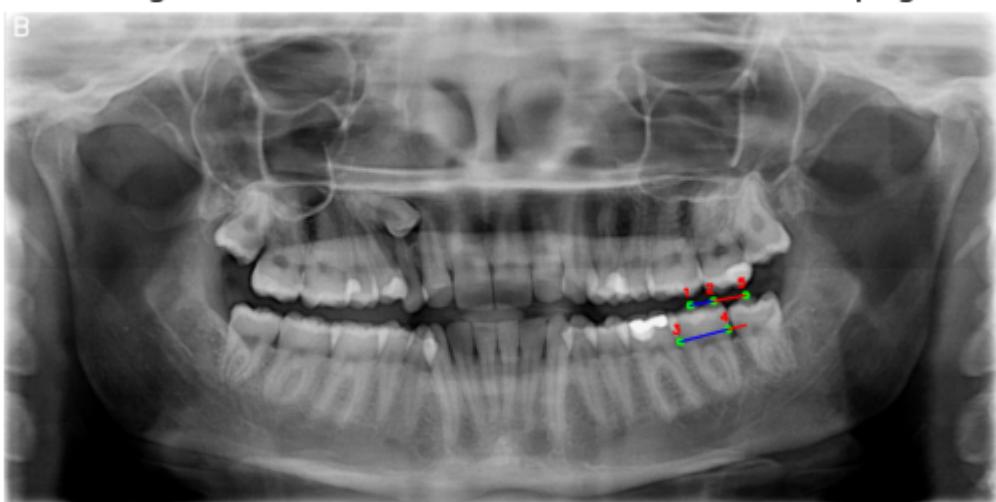


Image: son-132.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-133.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-134.png  
Expert Classification: A  
Predicted Classification: A

-----

Image: son-135.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-137.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-138.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-139.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-140.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-141.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-142.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-143.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-144.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-145.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-147.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-148.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-149.png

Expert Classification: B

Predicted Classification: B

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Image: son-150.png

Expert Classification: A

Predicted Classification: B

-----  
Image with Points and Classification: son-150.png

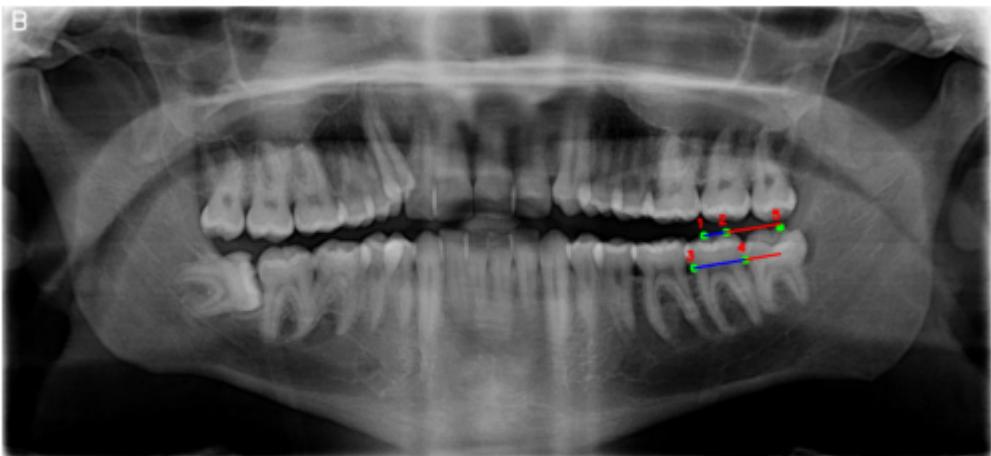


Image: son-151.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-152.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-153.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-154.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-155.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-156.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-157.png  
Expert Classification: C  
Predicted Classification: C

-----

Image: son-158.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-159.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-160.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-161.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-162.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-163.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-164.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-165.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-166.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-167.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-168.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-169.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-170.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-171.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-172.png  
Expert Classification: B  
Predicted Classification: B

-----

Image: son-173.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-174.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-175.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-176.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-177.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-178.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-179.png  
Expert Classification: A  
Predicted Classification: A

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Image: son-180.png  
Expert Classification: B  
Predicted Classification: B

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Image: son-181.png
Expert Classification: B
Predicted Classification: B
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Image: son-182.png
Expert Classification: B
Predicted Classification: B
-----
Image: son-183.png
Expert Classification: B
Predicted Classification: B
-----
Image: son-184.png
Expert Classification: A
Predicted Classification: A
-----
Image: son-185.png
Expert Classification: B
Predicted Classification: B
-----
Image: son-186.png
Expert Classification: B
Predicted Classification: B
-----
Image: son-187.png
Expert Classification: B
Predicted Classification: B
-----
Accuracy 37-38-PG: 0.89% (317/355 correct predictions, 38 wrong predictions)
```

In [ ]: