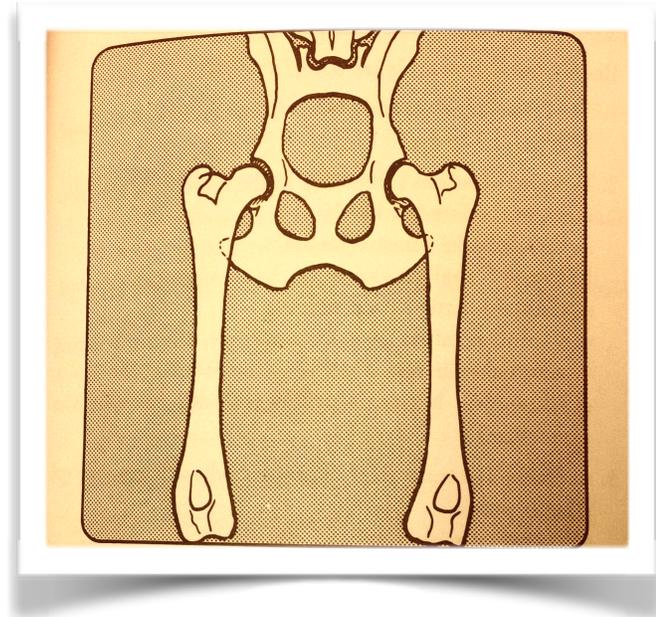


Disclaimer; PLEASE do not consider this resource FACT by any means. I am simply an enthusiast, looking to shed some light on the topic. Please do not utilize any of the images from this resource. Most of them are not mine, without credit, or are not cited properly.



# Understanding Hip and Elbow Radiographs

A very basic visual depiction of the differences in passing ratings and the variances that can impact a dysplastic rating.

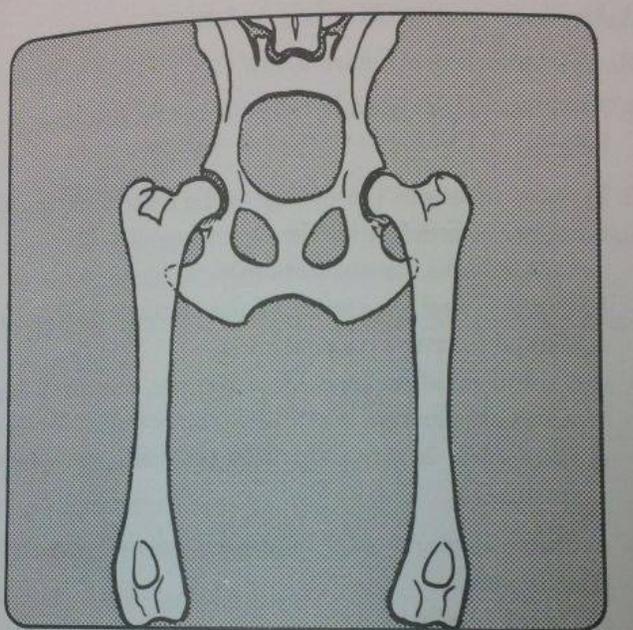
*“Good” hips - Medium Canine*



As we begin to study and analyze radiographs, it is difficult to determine the minute differences between individual ratings, and the things that impact them. There are many points to consider, when analyzing the joints, that can drastically impact our four legged children. This article is a visual aide to help encourage discussion and understanding into analyzing and interpreting individual radiographs and the OFA rating system.

## Normal Canine Pelvis (Ventrodorsal Projection)

These images depict “Normal” or passing hip x-rays, which includes the OFA ratings of Excellent,



Good and Fair. Positioning is important when analyzing the placement of the femoral head within the acetabulum. The pelvis should appear symmetrical in the image, asymmetry can indicate a lift in either hip and may alter the rating depending on the relation to the femoral head within the socket. A level pelvis, followed by parallel femurs and the patellae positioned on the midline of the distal femurs (Shown in illustration, NOT how OFA suggests). OFA recommends having the patellae (knee caps) positioned slightly inward, which can display the femoral heads in their best positioning for a rating. Heads should appear round and smooth, deep within the socket, with at least half of the femoral head within the acetabulum (socket). NOTE - the "Fovea Capitus" is a NORMAL flattened area on the femoral head. The femoral neck is also important to consider, there should be clear definition between the head and the femur itself. Any thickening of the neck can indicate dysplasia, depending on the severity of the thickening.

- |            |   |                                   |
|------------|---|-----------------------------------|
| NORMAL     | } | 1) Excellent for age and breed.   |
|            |   | 2) Good for age and breed.        |
|            |   | 3) Fair for age and breed.        |
| DYSPLASTIC | } | 4) Mild canine hip dysplasia.     |
|            |   | 5) Moderate canine hip dysplasia. |
|            |   | 6) Severe canine hip dysplasia.   |

Excellent rating, medium canine



Fair rating, prelim, medium canine



Rated Good, Medium Canine



Figure 2

## OFA Areas of Evaluation

**MULTIPLE ANATOMIC AREAS OF THE HIP ARE EVALUATED (FIGURE 2) INCLUDING:**

- Craniolateral acetabular margin**—Area where abnormal bone spurs (osteophytes) develop as the dysplastic joint attempts to stabilize the biomechanically unstable femoral head.
- Cranial acetabular margin**—Area visualized in conjunction with the hip ball to assess the degree of congruity and confluence of the hip joint.
- Femoral head (hip ball)**—Assessed to determine its fit into the socket and degree of congruity with the cranial acetabular margin forming the joint space.
- Fovea capitus**—Normal flattened area on ball for attachment of the round ligament; can be mistaken for degenerative changes if there is lack of familiarity or inexperience in interpretation of hip radiographs.
- Acetabular notch**—Area visualized to help assess depth of socket or "degree of fit".
- Caudal acetabular rim**—Area where bone spurs can form.
- Dorsal acetabular margin**—Area visualized to assess the depth of the hip socket (acetabulum) and percent coverage of the femoral head.
- Junction of femoral head and neck**—Area visualized to assess size, shape, and architecture of the femoral head/neck. The neck of the hip ball is usually the earliest and most commonly affected area where degenerative changes occur in a dysplastic joint. In the dysplastic joint, new bone builds up at the site of attachment of the joint capsule and muscular attachments. This is a result of abnormal stress created by incongruent articulation of the ball with the acetabulum during movement.
- Trochanteric fossa**—Area to assess for any microtrabecular bone changes or new bone proliferation.

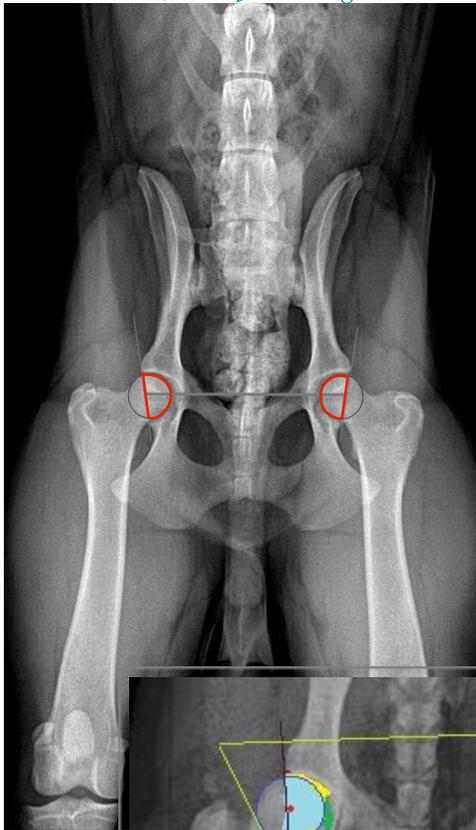
## OFA Specific Recommendation for Positioning

**Positioning**—Dorsal recumbency with the rear legs extended and parallel to each other and the stifles rotated internally is the prescribed position (**Figure 3**). This standard ventrodorsal view is accepted worldwide as the basis for evaluation of hip joint status with respect to hip dysplasia. Care should be exercised to be sure the patient is positioned correctly.

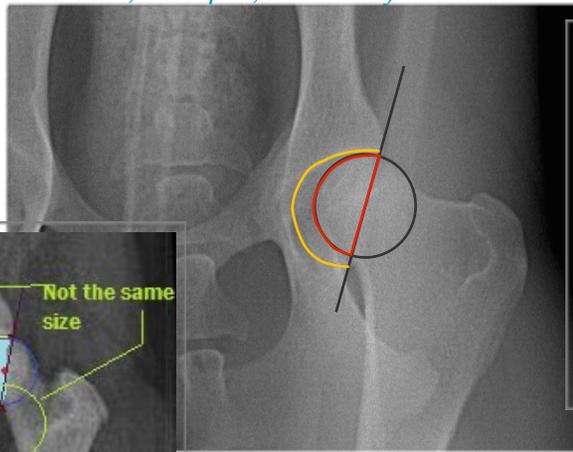
## Percent of Coverage Indicative of Ratings given

Rating	Percentage
Excellent	63%
Good	58%
Fair	49%
Borderline	None
Mild	40%
Moderate	30%
Severe	21%

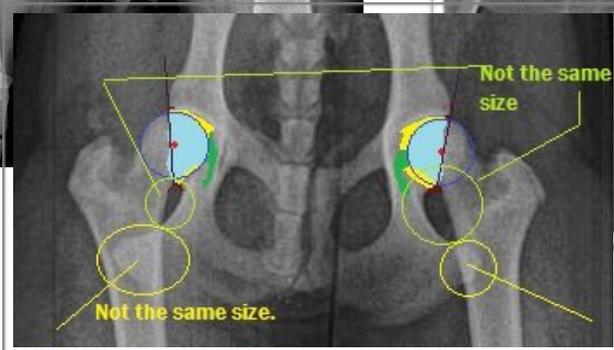
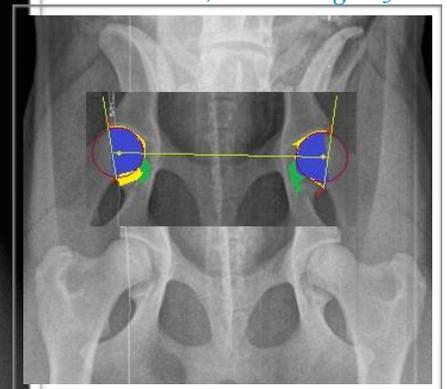
*Rated Excellent, over 63% coverage*



*Rated Mild, under 40%, Yellow laxity within socket*



*Rated Excellent, Blue coverage +63%*



Severe dysplasia

January 28, 2015

## Dysplastic Hip and other common variances

Dysplasia is characterized by Joint laxity, Subluxation, Luxation, and degenerative joint disease. Unilateral; one side, and Bilateral; both sides will be included in the rating. Image to the left a) Normal, b) Subluxation, neck thickening, c) Subluxation, Shallow socket, neck thickening, flattening of the head and d) Luxation of the Femoral head, Flattening, and degenerative changes to the femoral neck.

The angle of the neck is important to the placement of the head within the socket.

Image to the right - C) is correct, normal 130° angle of the neck. A) Coxa Vara and B) Coxa Valga.

ischemic femoral head necrosis...

### What to look for

- 1) Increase in the width of the joint space
- 2) changes in the appearance of the femoral head, including flattening and deformity.
- 3) coverage within the socket, or shallow seating within the acetabulum
- 4) thickening of the neck, and angle of the neck

- Craniodorsal luxation of the hip (avulsion fracture noted)

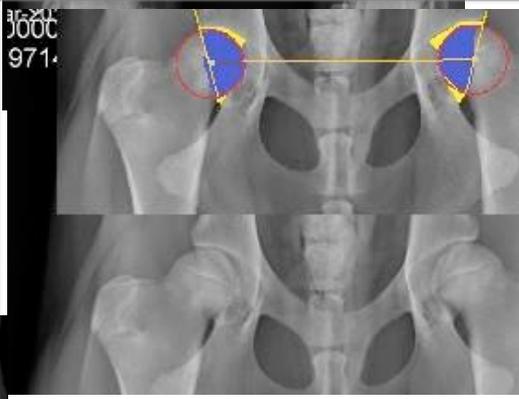
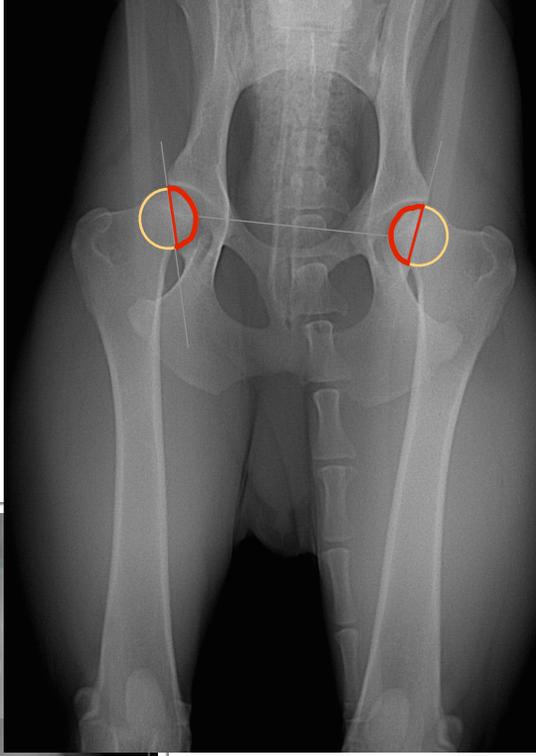
*Good rating, medium canine*



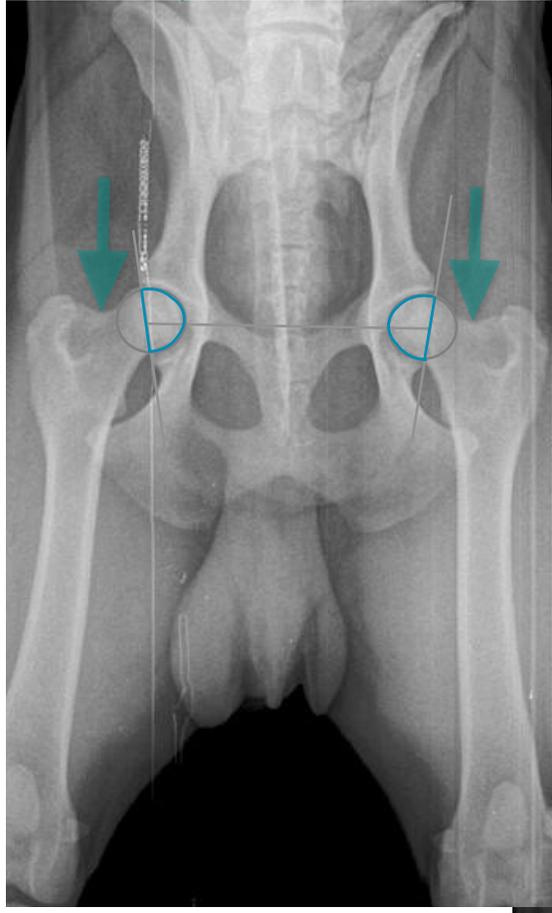
*Penn Hip 80th percentile, ("Good") Prelim Medium canine*



*Rated - Mild Unilateral Left, Medium canine (appears this could be bilateral, both look to be under 40% coverage)*



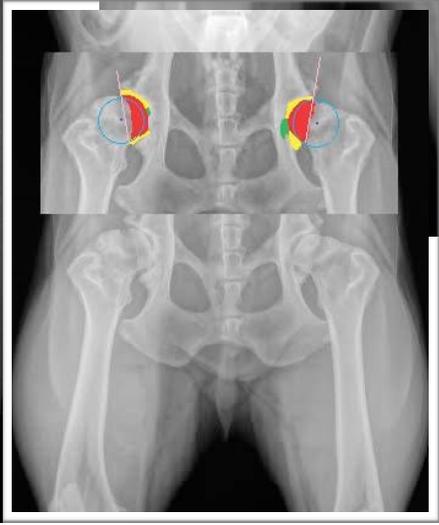
*Rated Excellent, Medium canine*



*Severe Bilateral Dysplasia, not rated*



*Good rating, prelim Medium canine*



# Elbow Radiographs and how to analyze the ratings

“LATERAL PROJECTION”

R- Radial Head

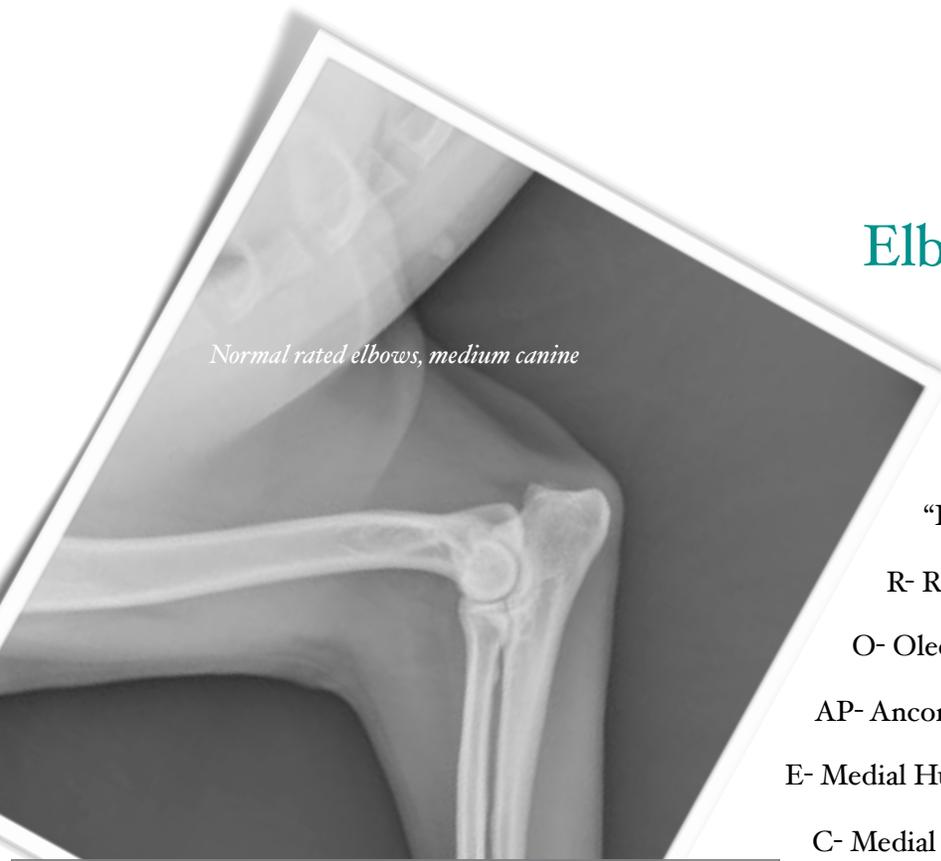
O- Olecranon

AP- Anconeal Process

E- Medial Humeral Epicondyle

C- Medial Coronoid Process of the Ulna

Normal rated elbows, medium canine



## OFA Classification of Elbows

Developmental diseases are the causes of elbow dysplasia in dogs, including Degenerative Joint Disease(DJD); Osteochondrosis(OCD), and Fragmented Medial Coronoid Process(FCP) are part of the DJD complex, and together become referred to as elbow dysplasia.

**Normal**—No evidence of inherited pathologic change

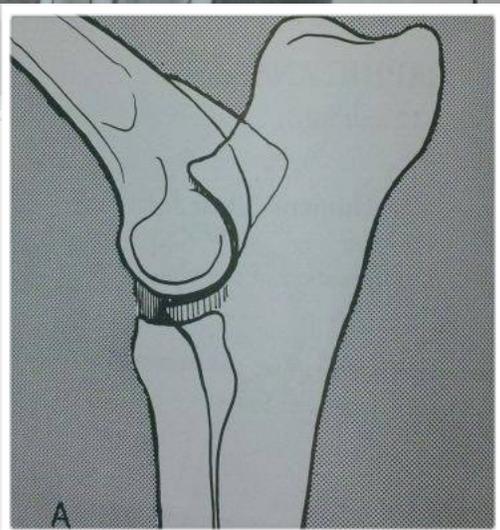
### Dysplastic

**Grade 1**—mild DJD – osteophytes less than 2 mm in height

**Grade 2**—moderate DJD – osteophytes 2 to 5 mm in height

**Grade 3**—severe DJD—osteophytes greater than 5 mm

An example of Subluxation of the humeral-radial joint. Extra lateral spacing within the joint.





## Grade 3 Elbow Dysplasia

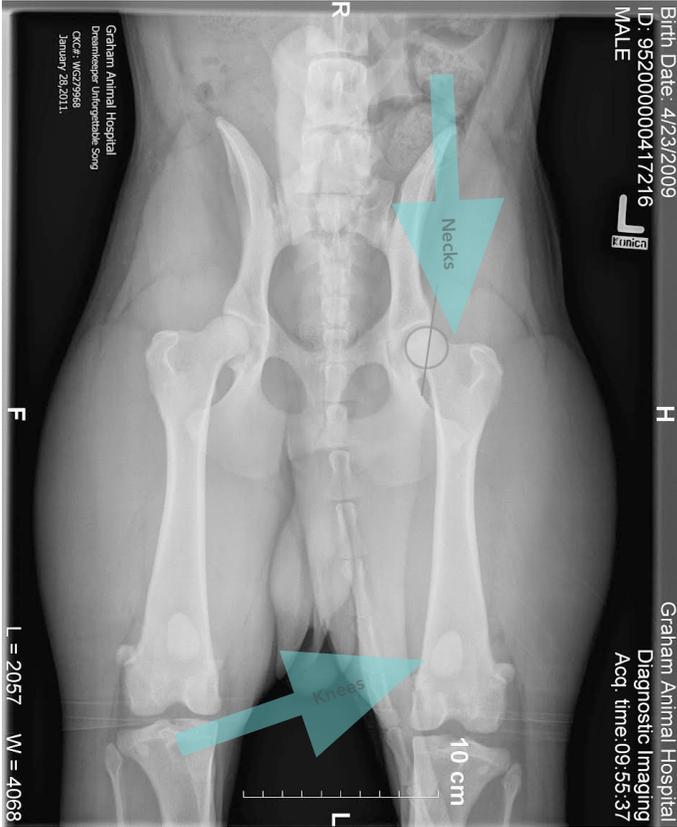
The Anconeal Process (arrow) has failed to join with the Ulna. Termed “UAP” - Ununited Anconeal Process of the Ulna where the inciting cause is disregarded, and secondary osteoarthritic changes are used instead to identify the presence of Elbow Dysplasia, as well as to grade the severity.

### **Grading System:**

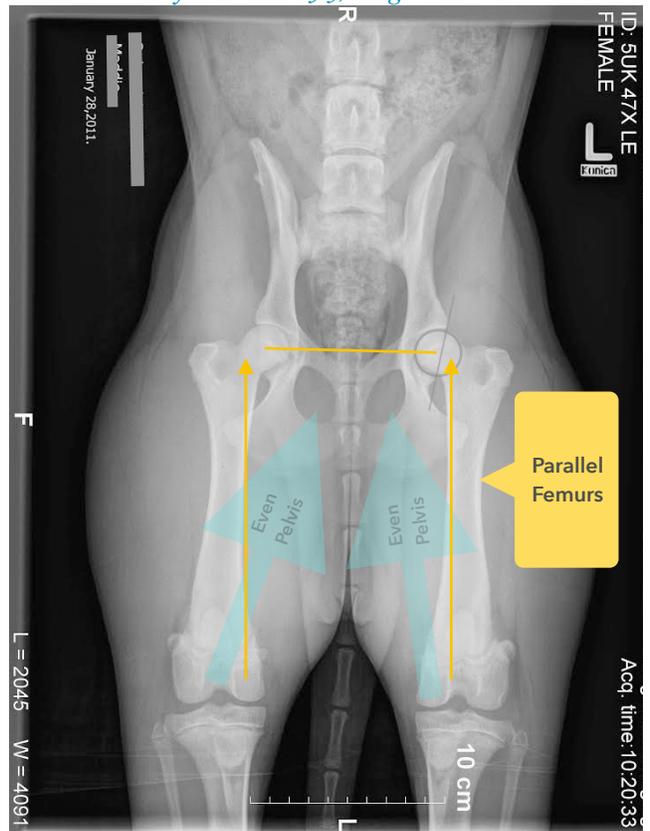
- Grade 0 = normal elbows (no enthesophyte formation)
- Grade 1 = Mild ED (<2mm thickness of new bone formation)
- Grade 2 = Moderate ED or a primary lesion (2mm to <5 mm of new bone)
- Grade 3 = Severe ED (5+ mm of new bone formation or UAP)

# MORE HIPS!

*OVC Passing grade, Large Canine, great positioning*



*British Veterinary Association 3/3, Large Canine (Excellent Positioning)*



*Rated Borderline, Large Canine (Positioning "COULD" affect rating)*



*Rated ???, Large Canine. Necks slightly thickened? HOWEVER, I believe they would pass, likely with a Good (imo). Coverage is amazing, no laxity.*

