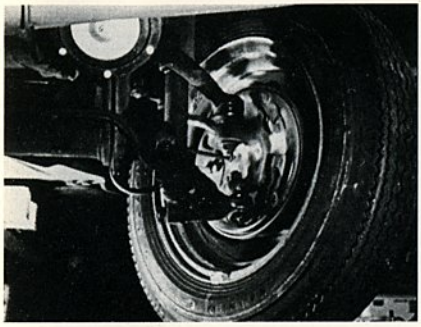
# Ball Joints

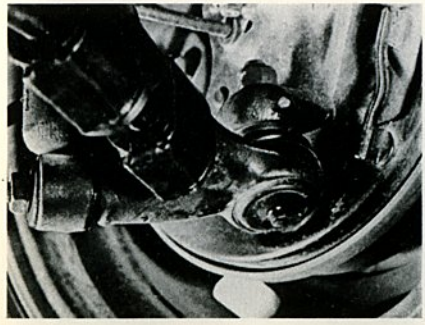
# Dealer Level Training


This is part 3 of our series, "Highlights of VW Maintenance".

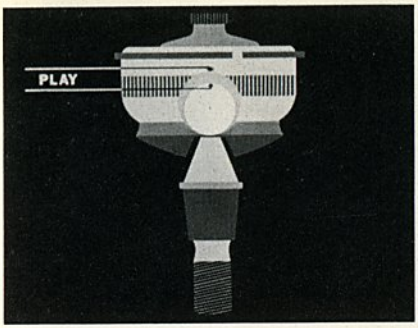


We're going to review the procedure for checking ball joints and explain why it is so important to perform these checks accurately.

The front wheel ball joints are checked during diagnosis and maintenance and from a saftey point of view, this is an extremely important check.

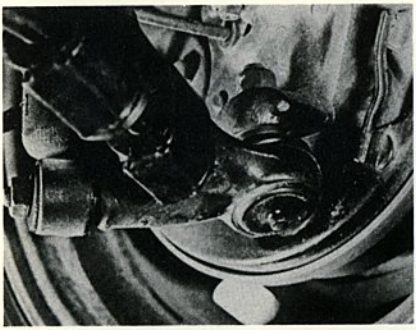


Ball joints serve as pivots permitting easy steering and up-and-down movement of the stub axle, as the vehicle moves over the road.



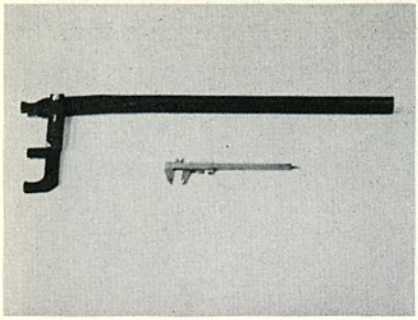

By necessity, a certain amount of play is built into each ball joint.


Excessive play, however, can result in erratic steering and rapid tire wear.

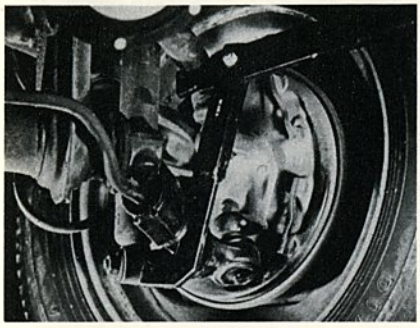


Therefore, the amount of play in each joint must be checked, to make sure they are within "wear limits".

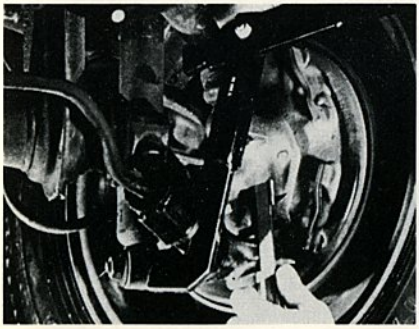

Let's clarify the term "wear limit". "Wear limit" is the allowable play set by the factory for a given part. It simply means that "parts which are near, or have reached the given limits, must be replaced".



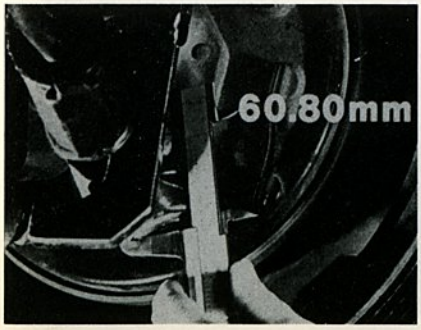
A vernier caliper and the special ball joint checking lever are used to accurately determine the amount of ball joint play.



Here's how these tools are used on Type 1 vehicles. First, insert the checking lever between the upper and lower torsion arms as shown here.

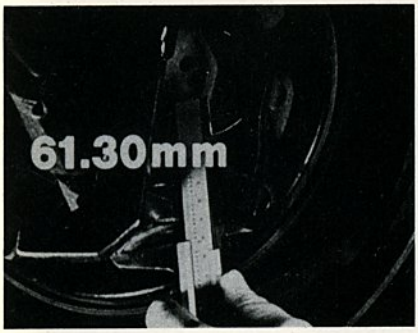


Next, place the vernier caliper on the lower ball joint with one jaw on the lower torsion arm, and the other jaw on the bottom section of the steering knuckle.

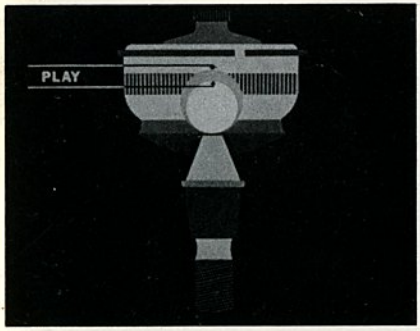



Note the measurement on the caliper, but don't remove the caliper or change the setting.

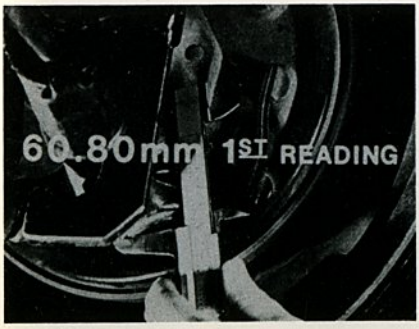
Now, pull down on the handle of the checking lever. This expands the torsion arms and reveals any ball joint play.




Check the caliper reading again. It's the difference between the 1st and 2nd reading that we are interested in.




Ball joint play is determined by finding that difference.

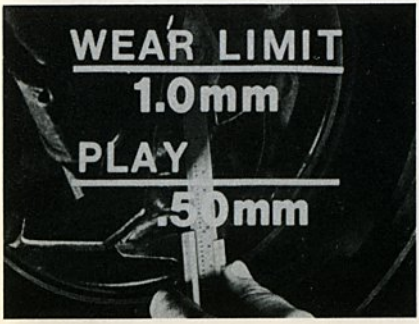



The first reading, 60.80mm was noted when the caliper was first placed on the ball joint.


It is substracted from the second reading, 61.30mm, taken from the caliper after pulling down on the checking lever.

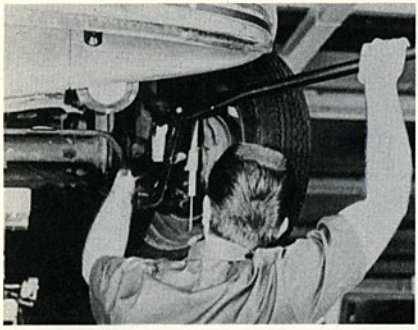

The .50mm difference between these two readings is the ball joint play.


On Type 1 vehicles the wear limit for lower ball joints is 1.0mm.

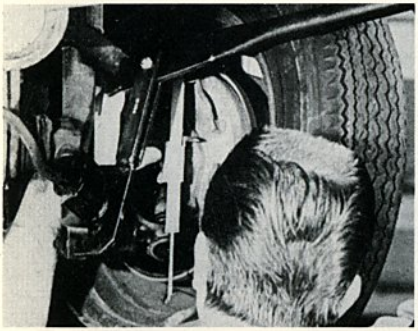



Since this ball joint is well within wear limits, no replacement is needed.

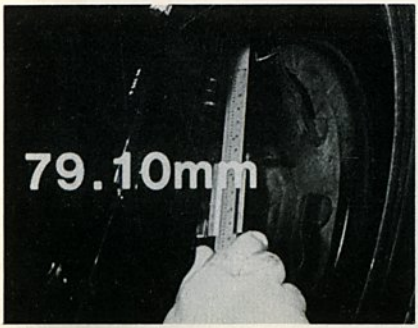

In view of the safety factor involved, it is essential to be exact when performing this check.



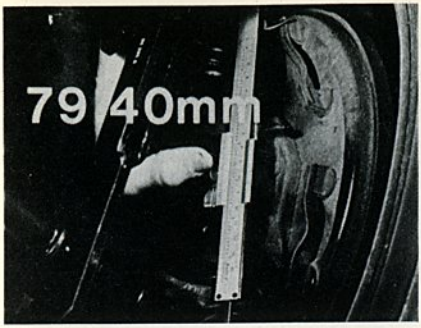
We will now move to the Type 1 upper ball joint which is checked in the same manner. . . .



but with the caliper moved to the upper ball joint.



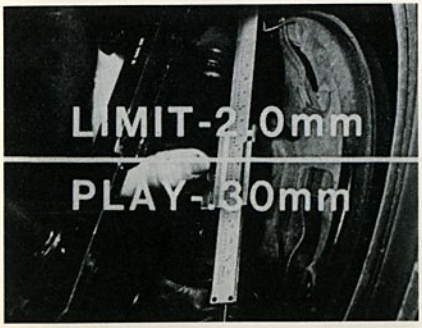

The procedure is the same: take a reading when the caliper is first placed on the ball joint.



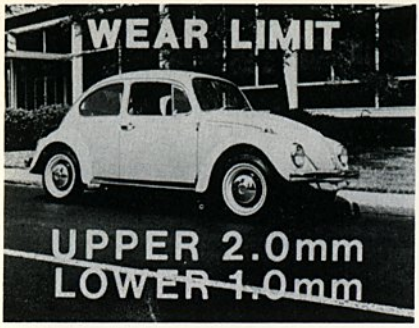

Then pull down on the lever and take a second reading.


Subtract the first reading from the second, and you have the play of the upper ball joint.


One important difference for Type 1 upper ball joints, the wear limit is 2.0mm.



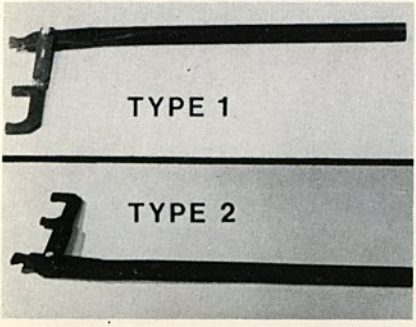

Since this ball joint is also within wear limits, no replacement is needed.



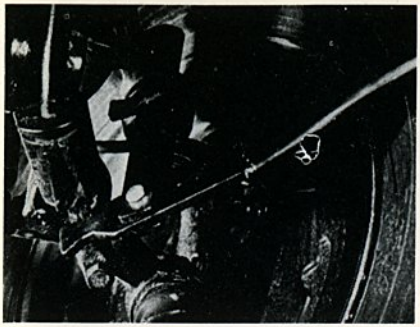

Now, let's review those wear limits. . . . Type 1, lower-1.0mm, Type 1, upper-2.0mm.

Now . . . a vehicle is waiting for us, so let's review these procedures on an actual car. Ask any questions during this break — then we will resume.

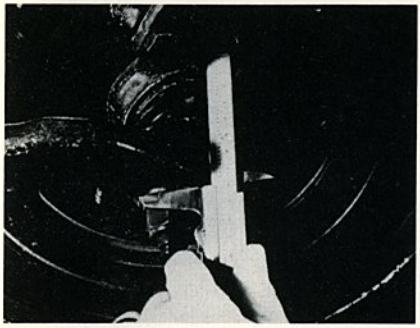
So far, we've only talked about checking Type 1 ball joints. Now we'll move on to Type 2 ball joints.



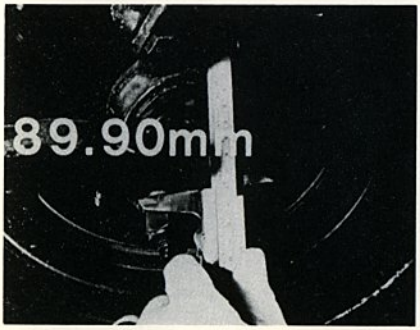

The lever is used in a slightly different fashion, as you can see in this comparison.



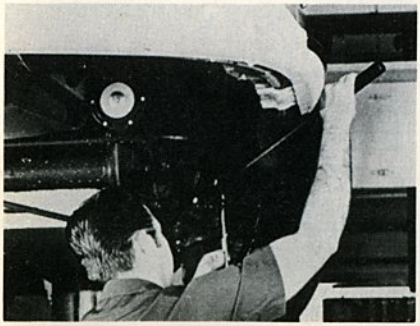
You must flip the lever into this position, and place it over each torsion arm.



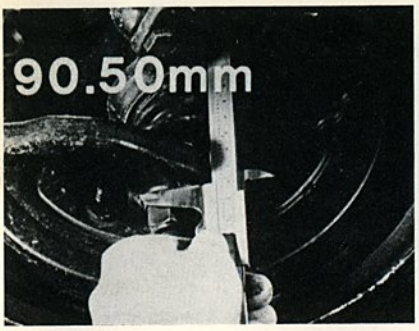
As before, the caliper is placed on the lower ball joint, with one jaw on the lower section of the steering knuckle, and the other jaw over the lower torsion arm.




Note the measurement. . . . . .



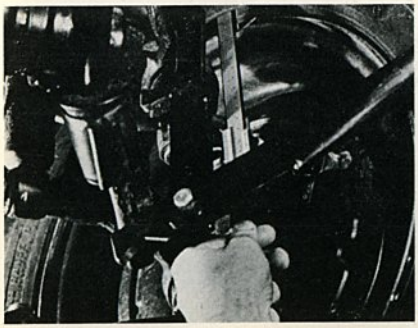
. . . then pull down on the lever handle. This raises the lower torsion arm so that the play can be read.



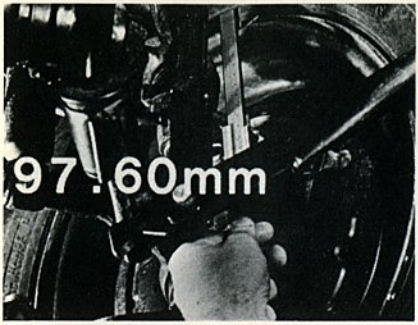

Read the caliper again, and note the reading.


Subtract the first reading from the second and you will have the amount of play.

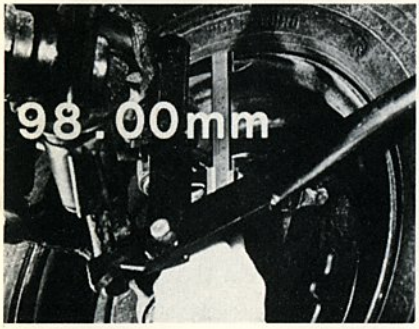

The wear limit for Type 2 lower ball joints is 2.0mm. If the play had exceeded this amount, the ball joint would have had to be replaced.



For Type 2 upper ball joints, the lever is used in the same manner, but with the caliper moved to the upper ball joint.




The procedure is the same. First take a reading. . . . . .

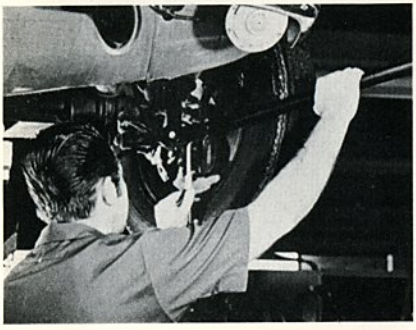



. . then pull down the lever and take another reading.

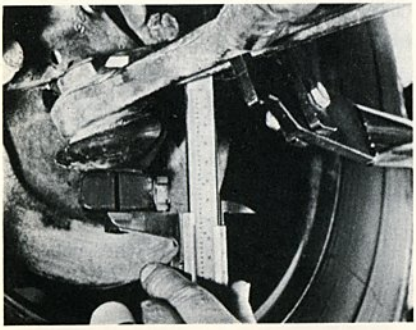

Once again, the first reading is subtracted from the second, and the resulting figure is the play of the ball joint.


The wear limit for the Type 2 upper and lower ball joint is the same.

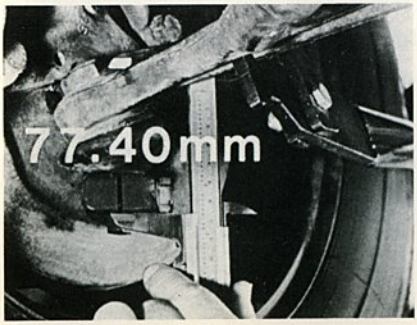
That covers Types 1 and 2. We will now move on to Type 3. The checking lever is used in the same manner as it was on the Type 2, and the procedure is basically the same.



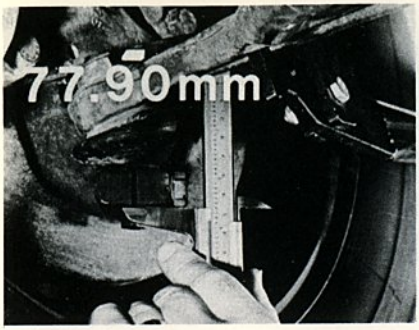
Position the lever over the torsion arms, and place the caliper on the lower ball joint.



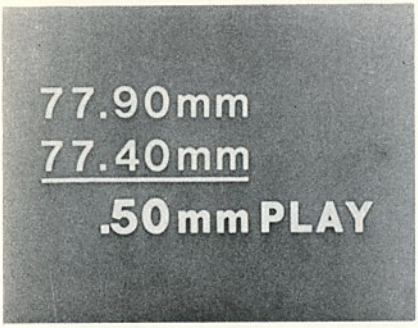
One jaw of the caliper is placed on the lower section of the steering knuckle, and the other jaw on the lower torsion arm.




Take a reading, and then. . . .

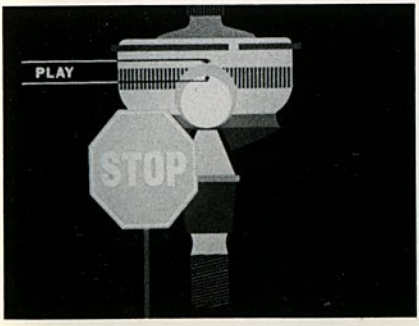



. . pull down on the lever and take a second reading.

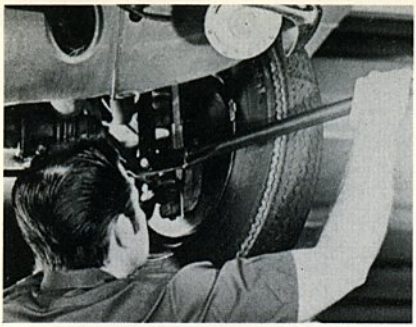



Subtract the first reading from the second, and the difference is the ball joint play.

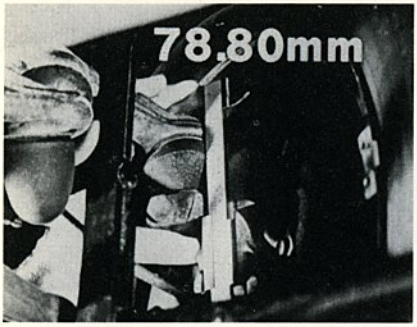

The wear limit for a Type 3 lower ball joint is 2.0mm.



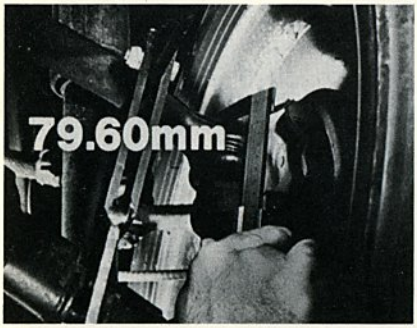

Let's stop for a moment. . . . . .
Up to this point, we have been consistent in the manner in which we checked ball joint play, but the Type 3 upper ball joint is different.



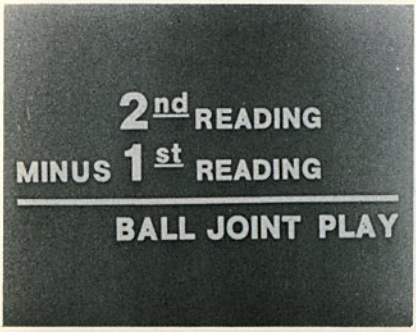
Unlike the others, you must press down on the lever handle. . . . .




. . . . before taking the first reading.




Now, release the handle and then take the second reading.



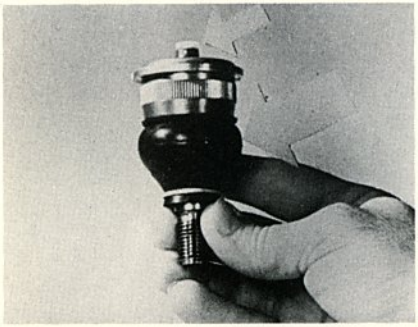

From here on it is the same, compare the first reading with the second, and the difference is the ball joint play.


The wear limit for the upper ball joint is 2.5mm.

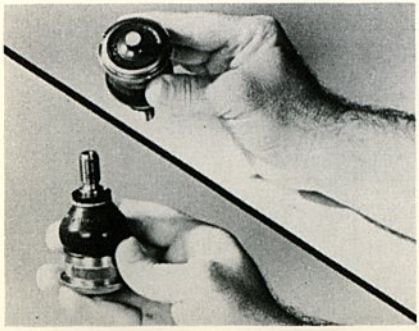
## BALL JOINT WEAR LIMIT COMPARISONS

| | UPPER | LOWER |
|---|---|---|
| TYPE 1 | 2.0mm | 1.0mm |
| TYPE 2 | 2.0mm | 2.0mm |
| TYPE 3 | 2.5mm | 2.0mm |

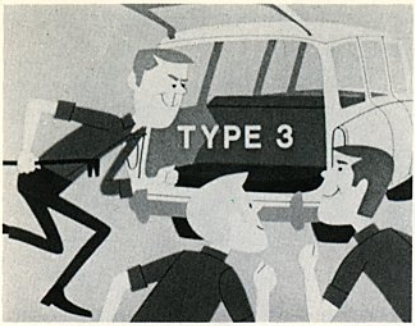
Let's review the wear limits for upper and lower ball joints on all three types of vehicles.
Notice that the figures in red are the only exceptions, all others have a wear limit of 2.0mm.



Finally, another important point to remember when you are checking ball joints – you should always check the dust seals and the plastic plugs for cracks or leaks.



Should the seals or plugs become broken or cracked, dust, dirt, or water can enter the ball joint and damage it. Cracked or broken seals or plugs must be replaced.




This concludes our film presentation, and, as before, you will now perform the procedures on an actual vehicle.


Ask any questions, and make any comments that you think are relevant.
Remember. . . . ball joint checking is important. . . . . .

END PART III BALL JOINTS